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AN EVALUATION OF THE PRESENT STATE OF WORLD TRADE IN ORNAMENTAL FISH

prepared by

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PREPARATION OF THIS DOCUMENT

Due to the lack of data on the ornamental fish trade, FAO has been unable to answer the increasing number of requests for information and advice on this topic coming from developing countries. It was therefore decided to engage a consultant to prepare a summary of the existing situation of this trade. The consultant's views do not necessarily reflect those of the Organization.

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1. INTRODUCTION

Thompson, Dill and Moore (1971) have stated that "so far as is known, there are no compiled statistics on the world trade in tropical aquarium fishes". This statement serves to emphasize the general unavailability of reliable information on the volume of trade in ornamental fish and on the monetary value of the same as a commodity in international commerce. The "Yearbook of Fisheries Statistics" published by FAO, for example, does not include ornamental species in its general coverage of the world trade in fish and fishery products.

Over recent years, it has become increasingly more apparent that ornamental fish form an important export item in the trade figures of many developing countries and all the available evidence points to a growing significance for this industry. To clarify the situation with regard to this trade, an Aquarium Fish Consultant, having the following terms of reference, was engaged by the Fishery Resources Division of the FAO Department of Fisheries:

(i) to collect information regarding the extent and nature of trade in aquarium fish;

(ii) to make proposals as to how this statistical information can be collected on a routine basis;

(iii) to report on any monitoring systems of natural stocks of aquarium fish and to make proposals whereby such monitoring can be carried out so that these natural stocks are not endangered by overexploitation;

(iv) to make other proposals concerning disease control, etc., as may be appropriate.

When reference is made to the trade in live fish for the aquarium, etc., the terms "aquarium fish", "pet fish", "tropical fish" and "ornamental fish" are frequently used in a somewhat indiscriminate fashion. In the present report the term "ornamental fish" alone has been retained, as it is believed that this is the designation which most accurately describes those species of saltwater and freshwater fish which, because of their attractive coloration, size and other characteristics, make them suitable for maintenance in captivity as "pets" in aquaria, garden pools and similar artificial environments.

2. VOLUME AND VALUE OF THE ORNAMENTAL FISH TRADE

According to recent estimates (Axelrod, 1973) the retail value of the live ornamental fish trade, including accessories, is in the region of U.S.$ 4 000 million per year on a worldwide basis. This estimate includes not only the supply of live fish, but also that of aquatic plants and invertebrates, together with associated activities such as the manufacture and supply of aquarium tanks, filters, pumps, heaters, fish foods, medications, publications and a variety of aquarium aids destined for the maintenance of saltwater and freshwater fish and invertebrates in captivity.

In the U.S.A. alone, the ornamental fish trade involves the importers in an expenditure of approximately U.S.$ 100 million per year for supplies of live fish and aquarium accessories from abroad and almost all of the fish which are imported are ultimately untended for the stocking of home aquaria. Calculations made for the year 1972 (Anon., 1973) indicate that the U.S. retail trade in live ornamental fish for that year had a value of U.S.$ 250 million, with an additional U.S.$ 350 million for the sale of sundry accessories and aquarium aids. The extent of the trade in ornamental fish and aquarium accessories in the U.S.A. for that year is broadly comparable to that involving cats and dogs combined, as the following data show:

Item	Value (U.S.$ million)		
	ornamental fish	cats	dogs
Live animals:	250	30	220
Accessories:	350	55	300
Total	600	85	520

According to figures given in an article published in a trade journal (Setzer, 1974), the value of the U.S. pet trade in terms of earnings for 1973 was as follows:

Item	Value (U.S.$ million)
Aquarium-related	698
Bird-related	263 (1972 figure)
Miscellaneous-related (turtles, snakes, exotics, small mammals)	163
Cat- and dog-related	2 482
Total	3 612

This figures of U.S.$ 3 612 million is stated to represent an increase of 7.4% on the earnings recorded for the previous year, 1972. The value of the "aquarium-related" segment corresponds to approximately 19% of the whole for 1973, and it is estimated that "exotic" fish have a value of U.S.$ 232.7 million - equivalent to some 33% of the total for this segment.

Although precise figures are not available, Axelrod (1973) has suggested that the trade in live ornamental fish in Europe is likely to be in the region of at least U.S.$ 100 million per year, basing this estimate on the value of the total exports from Hong Kong and Singapore alone. The degree of popular enthusiasm for aquarism may be judged from Axelrod's (op. cit.) estimate of 22 million enthusiasts in the U.S.A., 1.8 million in Canada, and 1.0 million dispersed throughout Central and South America. Estimates from other sources have indicated a figure of more that 2 million aquarium and garden pond enthusiasts in Japan, a country in which there are approximately 6 000 aquarium stores and in which more than 1 200 000 pieces of aquarium equipment are sold per annum. Estimates for 1973 put the number of aquarium enthusiasts in Spain at around 20 000, but figures for other European countries are lacking.

Any attempt to analyse or report on the extent of the world trade in live ornamental fish runs into a number of difficulties, among which may be cited the following:

(a) the lack of a uniform descriptive term under which such imports or exports are reported in the official records and statistics;

(b) the lack of a standard unit to report the volume of such exports or imports;

(c) a tendency for all countries to report the value of their trade in ornamental fish in local currency, frequently without any mention of the exchange rate operating at the time for the U.S.$ or other internationally convertible monetary unit.

The information which it has been possible to collect together in this report is given in the Tables which appear in Appendix I; in these Tables, the designation used by the country concerned is contained in the heading.

It has not proved possible to obtain precise figures on the volume and value of imports and exports of live ornamental fish from all of the countries which are actively involved in this trade and some isolated but pertinent information to complement the data given in Appendix I of this report is presented below:

(i) Brasil: In 1973 Brasil exported a total of 8 073 344 ornamental fish, 70% of which were neon tetras (Hyphessobrycon innesi) and cardinal tetras (Cheirodon axelrodi); these fish were exported chiefly to the Federal Republic of Germany, Guyana and the U.S.A.

(ii) India: The Indian authorities have no information on the export or import of ornamental fish to or from India.

(iii) Mexico: In 1973 Mexico imported a total of 330 000 live ornamental fish, valued at U.S.$ 21 000.

(iv) Pakistan: In 1966 importations were made of goldfish (Carassius auratus) from China, and angel fish (Pterophyllum scalare), tetras (species not detailed, Siamese fighting fish (Betta splendens) and guppies (Lebistes reticulatus) from the Federal Republic of Germany. According to data corresponding to 1975, the following ornamental species are reared in the country:

Carassius auratus
Pterophyllum eimekei
Mollienesia latipinna
Xiphophorus helleri
X. maculatus
Lebistes reticulatus
Gymnocorymbus ternetzi
Puntius tetrazona
Trichogaster trichopterus
Helostoma temmincki
Puntius semifasciolatus
Betta splendens
Aequidens pulcher

(v) Peru: The Peruvian live ornamental fish export trade commenced in 1965, with the sale of 4.9 million fish. In 1969 the sales had risen to 10.74 million fish; the Miami trade was worth U.S.$ 214 780 for that year, with exports from Lima having a value of U.S.$ 6 951 for 1969. In 1970 approximately 13.7 million fish were sold, the value of which was U.S.$ 320 000 at Iquitos.

(vi) Singapore: Singapore is rapidly becoming one of the world's major exporters of live ornamental fish. In the year 1967 the total live fish exports were worth Sgp.$ 2.3 million (U.S.$ 1.00 = Sgp.$ 3.04) to 40 countries, chief among which were Japan, the Federal Republic of Germany, the U.S.A., the U.K. and The Netherlands. Imports of ornamental fish for 1967 were valued at Sgp.$ 1.2 million and the imports were effected from 16 countries among which Hong Kong and Thailand figure prominently. In 1973 Singapore exported Sgp.$ 13.4 million of freshwater and saltwater ornamental fish, in addition to Sgp.$ 0.96 million of freshwater aquarium plants.

(vii) Venezuela: Between 1972 and 1974, one individual had received permission to export 3 210 148 fish; during the same period a second individual had exported 10 147 500 fish from Venezuela to 5 sources in the U.S.A., 7 sources in the Federal Republic of Germany, 2 sources in The Netherlands and 1 source in the U.K.

3. SOURCES OF SUPPLY OF LIVE ORNAMENTAL FISH

At the present time, the majority of the ornamental fish of interest to the aquarium trade are species which are native to the tropical and subtropical areas of the world. The data relating to the extent of this trade in the U.S.A., the biggest importer of ornamental fish, give a most valuable insight into the principal sources of supply. When the information provided in Table 50 is analysed, it becomes apparent that during the year 1973, eastern Asia (69.15%) and Latin America (27.14%) were the main regions of the world from which these fish were obtained. Africa (1.77%) provided only a small fraction of the total U.S. imports of live ornamental fish for that year.

Among the eastern Asian countries, the three major suppliers were Hong Kong (23.42%), Singapore (12.50%) and Thailand (18.82%). Taiwan (6.01%), the Philippines (5.39%) and Indonesia (1.69%) show evidence of an increasing development of their ornamental fish export potential. Japan (1.32%) is well known as a traditional supplier of high-quality cyprinids such as ornate varieties of goldfish and Koi carp (Cyprinus carpio), for which Japanese producers have achieved an excellent reputation. Although a considerable potential for the development of a profitable live ornamental fish export trade exists in India, Malaysia and Sri Lanka, the current volume of registered exports from these countries is relatively small.

A significant proportion of the ornamental fish which are exported from Asia are species which have been bred and cultivated in captivity on a local commercial basis. Very few native fish are exported from Hong Kong, where the tendency is to specialize in the local production of determined species and in the importation and trans-shipment of fish from other sources. A similar situation

holds true for Singapore, which exports approximately equal numbers of locally-bred fish, and fish which have been received from elsewhere. Thailand, whose ornamental fish export industry has undergone considerable development within recent years, exports some 80% of local wild-caught species and 20% locally-bred fish respectively; among the latter, species of anabantids such as fighting fish (Betta splendens) hold pride of place.

Japan and Korea are known to have a significant industry based on the breeding of selected races or strains of cyprinids. In the Republic of Korea, for example, the production of goldfish rose from 0.8 t in 1969 to 1.6 t in 1972. During the period 1972/73, a total of 3 t of goldfish was produced in South Australia, although little information is available on the ultimate destination of these fish.

Latin America (27.95%) has long been famed for its wide variety of attractive ornamental fish suitable for the aquarium and certain South American countries, such as Brasil and Colombia, have been gradually building up an export trade with the U.S.A. over the course of the last decade or so. From the data presented in Table 50 it is clear that Brasil (3.86%), Colombia (9.41%), Guyana (7.36%) and Peru (4.95%) are currently the major Latin American exporters of ornamental fish for the U.S. market. Imports from other Central and South American countries are extremely modest in comparison, although again it is likely that a considerable potential exists for satisfactory commercial development of this trade. It is known, for example, that Argentina, Bolivia, Chile, Mexico, Paraguay and Venezuela possess native fish faunas rich in species of possible interest to the ornamental fish trade, even though such exports might be limited initially to certain selected species. As is the case with Asia, smaller South American countries, such as Guyana, Surinam and Trinidad, have traditionally based a sizable proportion of their ornamental fish export trade on species which have been collected and purchased from neighbouring countries. In certain instances, the wholesale prices for the more popular species of fish may be increased by up to 10%, but the importers appear prepared to absorb this difference in return for the more ready availability of species which they require and which may not always be available from the countries to which the species of fish are native. In practically all cases, the Latin American ornamental fish export trade is based on the capture of fish in the wild; although precise figures are not available, it has been estimated that more than 8 million catfish per year are exported to the U.S.A. from Latin America. The fact that only about 15% of the more popular Latin American species can be bred successfully may, in part, account for this reliance on wild-caught specimens as a basis for the export trade. In general terms, it appears that little attention has been given to the commercial possibilities for the breeding and production of ornamental fish in fish farms or other types of rearing units in Latin America.

The African continent contributed a modest 1.77% of the total U.S. imports of ornamental fish during 1973 and much of this trade was based on selected native species such as Malawi cichlids, which are highly esteemed and prized by aquarium enthusiasts. Although there is clearly a considerable potential for development, this opportunity has not always been fully exploited. It can be stated, therefore, that the majority of the African exports are of cichlids native to the lakes of East Africa, with an increasing interest beginning to be shown in the potential for West African and Central African species.

Europe possesses very few native species which are of interest to the ornamental fish trade and, in terms of exports to the U.S.A. during 1973, the only European country to be mentioned by name was the Federal Republic of Germany (0.16%); it is highly likely that the major export of ornamental fish from Germany was of varieties bred within the country itself, since German breeders have acquired a fame for the breeding of "difficult" species of ornamental fish. Italy is traditionally regarded as being one of the main sources of supply of the goldfish sold in the trade in Europe, but no precise data on the extent of this trade have been obtained. An interesting fact to have emerged from conversations with major European ornamental fish importers is the degree of interest in obtaining supplies of the more popular and desirable species which have actually been bred within Europe. It is claimed, for example, that the supply of such fish on a regular basis from reputable sources would not only reduce the overheads and costs of packaging and transportation, but would also allow for a greater degree of control with regard to the disease status of the stock and of the production units. For the time being, however, it seems that Europe will continue to figure among the major importing areas with respect to most of the ornamental fish species.

Concerning the importation of ornamental fish into the U.S.A., it has been calculated that approximately 70-75% of these imports reach the country via Florida, with Miami and Tampa being the main ports of entry (Lachner et al., 1970). From the figures which are available, this would indicate that the numbers of fish imported each year through Florida are as follows:

Year	Estimated total number of fish imported (millions)	Estimated number of fish imported via Florida (millions)
1968	64.0	44.8-48.0
1971	99.0	69.3-74.3
1972	110.0	77.0-82.5

Axelrod et al. (1969) have stated that fish for the aquarium trade constitute the principal single air freight commodity in Florida and that during an average week some 5 000-6 000 boxes of live fish are shipped from the State. On the assumption that each box holds an average of 175 specimens, this would mean that Florida provides between 0.875-1.05 million ornamental fish per week in the U.S.A., a figure which indicates a total shipment of at least 45.5 million live fish per year. In the U.S.A., Florida not only represents the principal centre for the trans-shipment of incoming ornamental fish, but is also of importance in the breeding and production of determined species for the U.S. domestic market. It has been suggested (Axelrod, 1971) that most of the 450 or so individuals involved in the importation and/or production of ornamental fish in the U.S.A. are located in Florida, many of them within a 50-mile (80-km) radius of Miami or Tampa.

4. RESOURCE IDENTIFICATION

4.1 Freshwater Fish

Lachner et al. (op. cit.) have indicated that the numbers of freshwater species of fish likely to be of interest to the aquarist would be in excess of 6 000. The families of greatest interest are currently the Characidae, Cyprinidae, Cobitidae, Cyprinodontidae, Callichthyidae, Loricariidae, Cichlidae and Anabantidae. At any one time, it seems that more than 1 000 different species of freshwater ornamental fish may be acquired from wholesalers in the U.S.A. Doubtless this figure will increase rapidly just as soon as new varieties become available on a commercial basis. Modern techniques of tranquilisation and air transportation have helped the ornamental fish trade to ship and be supplied with live specimens from the wild; it yet remains to be seen the effect which controlled production of the more popular species will have on the availability of wild-caught fish, although considerable success has been achieved in Asia with this form of aquaculture.

4.2 Saltwater Fish

Although wild-caught saltwater fish only formed approximately 1% of the total ornamental fish imports into the U.S.A. during 1972 and 1973, the future for the saltwater side of the industry appears to be extremely promising. Over the past few years significant advances have been made in our knowledge of the maintenance of different types of saltwater fish and invertebrates under artificial aquarium conditions. Among these advances, improvements in tank design and construction, better seawater filtration and purification systems, balanced sea-salt formulations, correctly prepared artificial feeds (including freeze-dried preparations), etc., may be cited as examples. The progressive, and continued, development of novel techniques such as those cited above has led to the possibility of saltwater fish being successfully maintained in aquarium tanks in inland towns and cities, thereby contributing to the current popularity of saltwater aquarism among enthusiasts. The potential for commercial development is not restricted to fish alone, but also includes an increasing variety of saltwater invertebrates - for which an expanding market is now in existence.

A perusal of price lists supplied by the dealers in saltwater fish shows that the families of greatest potential interest to the hobbyist include the Chaetodontidae, Pomacentridae, Acanthuridae, Labridae, Balistidae, Scorpaenidae, Apogonidae, Ephippidae, Holocentridae, Ostraciidae, Canthigasteridae, Gobiidae, Syngntahidae, Antennariidae, Diodontidae, Monodactylidae, Scaridae, Scatophagidae, Zanclidae, Blennidae, Ogcocephalidae, Siganidae and Theraponidae, in that order of importance.

Although at the present moment the variety of saltwater species which are available through the trade is more restricted than is the case with freshwater fish, many dealers use as part of their sales campaign the fact that they hold more than 100 different species of saltwater fish at any one time. The greater majority of the saltwater species which are commercialized through the ornamental fish trade are widely distributed in tropical waters, usually occurring in intertidal zones up to a depth of approximately 30 m; with very few exceptions these fish are to be found not further than 6 km from the nearest land, usually in or around a coral reef. The main regions of the world which possess a saltwater fish fauna of potential interest to the trade are the following:

(i) Caribbean: Areas of the Caribbean with salinities ranging from 33-35 °/oo, and surface water temperatures of 25-29°C, are found particularly near the islands of the West Indies, Central America, parts of N.W. South America and off the coast of Florida, U.S.A.

(ii) Indo-Pacific: The Pacific Ocean has considerable variations in salinity and surface water temperatures, ranging from 32-36 °/oo and 20-25°C respectively. Many of the preferred areas for the collection of "aquarium" fish are situated in the Indian or Pacific Oceans, and these areas include the coast of California, U.S.A., Hawaii, the Philippines, the Great Barrier Reef and Indo-Australian archipelago, Mauritius, Madagascar, Sri Lanka, Indonesia, Polynesia and Micronesia.

(iii) Red Sea: The Red Sea, with a surface salinity of 40 °/oo and a surface water temperature of 22°C, contains a number of interesting species of saltwater fish suitable for maintenance in the aquarium. For example, many of the scorpaenids (e.g., Pterois sp.) used in the trade are captured in this area.

5. RESOURCE UTILIZATION

5.1 Collection Techniques

5.1.1. Freshwater species

The modus operandi for the capture of wild freshwater fish species is, in most respects, common to all of the countries in which an ornamental fish export trade exists. The description given in the present report, based on the Consultant's personal experience in the field, refers particularly to the situation as it exists in South America.

In practically all instances, the fish are captured in situ by native fishermen using nets such as hand seines and dipnets. The catch is then transferred to recipients made of plastic, metal or other materials and is held pending delivery by canoe to the exporters' holding facilities or, alternatively, until the arrival of a boat from the exporters' collection centres.

5.1.2 Saltwater species

The capture of saltwater species for the ornamental fish trade differs from that concerning freshwater species in that divers are frequently necessary to enable the fish to be collected from coral reefs, etc., in which the fish occur naturally. Although certain species (e.g., pomacentrids) form small shoals, most of the saltwater aquarium fish are solitary in their habits, a fact which makes their collection in large numbers a more difficult proposition. Two principal methods of capture are commonly practised: if its size permits, a complete piece of the coral reef may be removed and placed in toto into a plastic bag; alternatively, a substance such as formalin or an anaesthetic such as quinaldine may be introduced into the crevices in the coral used by the fish as hiding places, thus enabling the animals to be captured more readily. Various types of nets, fish traps and live buckets are becoming increasingly used in the collection of saltwater species on a commercial scale, and the method of capture used must be adapted to the behaviour and habits of the individual species of fish. The use of baited hooks is not favoured by the more reputable dealers, as the fish tend to be damaged and, as a result, are more susceptible to secondary infections of the wounds.

5.2 Packaging and Transportation

For all practical purposes, the methods of packaging and transportation of both freshwater and saltwater fish are sufficiently similar as to enable them to be considered under a single heading.

The first stage in the operation is for the fish which are received from the catchers to be placed in suitable holding tanks at the exporter's establishment. These holding facilities may be outdoor ponds (e.g., earth or concrete), aquaria, metal containers or floating cages. In certain parts of South America, for example, it is common to see zinc tanks being used to hold fish prior to shipment.

The exporter then prepares an appropriate number of air- and water-tight plastic bags, which are half filled with water (approximately 4-5 l). In Asian countries, e.g., Hong Kong and Singapore, the water used to fill the bags is often taken from a special storage reservoir, such as a pond or shallow well, or from the tap (in which case it is also usual for rainwater to be added as well). In South America (e.g., Colombia, Peru, Venezuela) it is common for the water used to fill the bags to be taken directly from a nearby stream or river. However, recent recommendations made in Colombia have resulted in the use of water from the mains and this is left standing for a few hours so as not to harm the fish.

The next step is for the fish to be counted and added to the bags. The number of fish per bag depends, to a large extent, on the size and behaviour of the species to be transported; the more reputable exporters state on their price lists the numbers of each individual species per container and it is unusual for different species to be mixed together in the same bag for shipment.

On receiving their complement of fish, the air is removed from the upper half of the bags and is replaced with oxygen. In the case of certain catfish species, enough air is left in the bag to permit a final mixture of two parts of oxygen to one part of air. The tops of the bags are firmly closed by means of rubber bands and the bags are placed into boxes. In most cases the exporters use boxes made of styrofoam or corrugated cardboard and these, in turn, are placed into a second box of cardboard. Regulations enacted by the Government of Colombia stipulate that all shipments of live ornamental fish shall be made in accordance with techniques established by the fisheries biology service, and these include the use of double plastic bags and suitable insulation of the inside of the boxes. The use of double corrugated cardboard boxes is an unsatisfactory practice, as it does not allow for a sufficient degree of protection to the fish against sudden temperature changes in the outer environment. The outer box and wrapping material usually bear a clearly-printed warning to the effect that the package contains live ornamental fish and that is should not be exposed to excessive temperature fluctuations (particularly cooling) or to excessive handling. The boxes and their contents are packed in such a way as to permit and facilitate routine inspection by customs authorities and others who may be empowered to certify the nature of the merchandise, as much in the country of origin as in the country of receipt.

At the present time, it is becoming increasingly common for the more informed exporters to make use of substances designed to tranquillize the fish during shipment. Among the tranquillizers used figure benzocaine, quinaldine and tricaine methane sulphonate; many Asian shippers, for example, add a few drops of an aqueous solution to the last-named substance to the gills of the fish immediately prior to dispatch, and the custom of using quinaldine for saltwater fish tranquillization is becoming more widespread. The use of tranquillizers induces a state of minor (Grade 1 or 2) anaesthesia in the fish and thereby reduces their metabolic rate so as to allow larger numbers of individuals to be shipped simultaneously, with reduced risks of death or damage. The use of tranquillizers is not, however, generalized throughout the ornamental fish trade. In the case of certain saltwater varieties, such as acanthurids, some shippers deliberately remove the spines from the fish to avoid damage during shipment. This practice is to be strongly condemned, as removal of the spines invariably leads to the occurrence of secondary infections causing death among the fish.

Shipments of ornamental fish are usually carried to their destination by air. Many airlines, particularly those of the developing nations, offer special services with regard to the transportation of live ornamental fish; among these services may be mentioned the free use of telegraphic and telex facilities by their clients and the availability of special commodity rates based on the volume (weight) of the boxes to be carried. Other facilities offered by airlines may include the provision of insulating materials, heated holding areas, etc., to help protect the fish against sudden ambient temperature changes.

On arrival at their destination, the shipments are collected by the importer or his agent, who then assumes responsibility for customs clearance and other formalities imposed by the country concerned. When these formalities have been duly completed, the fish are taken to the importer's holding facilities for unloading. Subsequent shipment of the fish to wholesale and retail establishments are made by air, road or rail, depending on the location of the purchaser and the distances involved.

5.3 Commercial Considerations

In the ornamental fish trade, it is customary for the prices of the fish to be quoted in terms of U.S.$ per individual fish, frequently with special rates operating for a minimum number of one particular species. In certain cases the price varies according to whether they are described in the dealers' lists as "small", "medium" or "large"; usually, in these cases, the exporters state the actual size of the fish as a guide to the importer. As was stated in section 5.2 above, the numbers of fish of each species per box is also given in most of the shippers' price lists, and in this way the importer can more easily calculate the total outlay for each order which he may place with the shipper for a determined species or collection of species.

Where the exporter has to make arrangements for the purchase of a particular species from a third source, i.e., in the event that the species does not occur naturally in the country from which the shipment is to be effected, the handling charges are invariably reflected in the wholesale prices the exporter charges his clients. As an example, a species costing U.S.$ 0.03 per fish ex the country of origin may be quoted at U.S.$ 0.04-0.05 per fish where trans-shipment has to made via a supplier in a second country. Purely as an illustration of the range of prices charged by exporters in different

countries for the same and for different species of saltwater or freshwater fish, representative wholesale prices and lists of available species are given in Appendix II to this report. For comparative purposes, the wholesale prices quoted by importers in the U.S.A. and certain European countries are given in Appendix III. Unfortunately, it has not been possible to include representative price lists from African suppliers, as no request for information addressed to these sources received a reply; in the same way, such requests for wholesale prices addressed to a number of U.S. wholesalers were either not favoured with any reply at all, or with a firm but polite refusal on the grounds that such data were only furnished to established dealers in ornamental fish. The lack of response from the U.S.A. was circumvented by devious, though perfectly legitimate means, and as a result it has been possible to include such information in Appendix III.

One of the major expenses connected with the shipment of live ornamental fish is the cost of air transportation from source to destination, and this cost frequently exceeds the total cost of the fish themselves. It is interesting to note that shipments from Hong Kong, Singapore and Thailand to Europe are less expensive, in terms of air freight charges, than is the case with shipments of the same species to Europe from the U.S.A. This is due, in part, to the favourable commodity rates charged by airlines operating from these Asian countries as a stimulus to trade. The same consideration may also help to explain why many of the more popular saltwater species favoured by U.S. enthusiasts are captured in waters off the coasts of Florida, California, etc., whereas in Europe most of the saltwater species encountered in retail establishments are of Asian origin. It is interesting to note that the development of fairly well defined "preferences" for certain saltwater species in the U.S. and European markets respectively, doubtless due in part to the relative availability of these fish at "reasonable" prices to the hobbyist.

It is difficult to give any precise figures for the numbers of individuals or companies involved in the exportation and/or commercialization of ornamental fish in each of the countries from which such shipments are regularly made. From conversations with U.K. importers, it might be thought that "just about everyone in ... (name of country) seems to be exporting aquarium fish"; although this remark was obviously made in jocular vein, it does help demonstrate the considerable appreciation of the monetary value and foreign exchange potential of a well developed and organized ornamental fish exportation industry in several of the developing nations. Based on a personal knowledge of the present situation as it exists in Latin America, the Consultant suggests that the following data might reflect the extent of the organized export trade in live freshwater ornamental fish from the region:

Country	Number of exporters
Argentina	5
Belize	1
Brasil	13
Colombia	36
Ecuador	2
Guyana	13
Mexico	2
Paraguay	1
Peru	16
Surinam	1
Trinidad	1
Venezuela	2

Again with reference to Latin America, isolated attempts have been made from time to time by individuals to furnish certain Central American fish (e.g., cichlids) from Costa Rica and Guatemala, for example, to the ornamental fish trade, but to date this endeavour cannot be classified as a "commercial activity". Indeed, suppliers of live ornamental fish to the domestic markets in Costa Rica, Guatemala, Mexico and Panama tend to rely on imports from abroad, rather than on the rational exploitation of native species to be found in Central American waters. A situation somewhat similar to this also exists in South America, and in Argentina and Venezuela (countries which possess a native fish fauna rich in species suitable for maintenance in aquaria) many aquarists show a preference for imported

varieties in place of the native species. This dependence on imported fish has led to an interesting situation whereby the fish are frequently purchased from dealers in Miami or Tampa, rather than from exporters in the Latin American countries to which several of the species are native and are exported to the U.S.A. There are encouraging signs, however, of an increasing interest in the possibilities of acquiring the more popular species from the suppliers in South America, rather than continuing the dependence on shipments (or trans-shipments) ex the U.S.A.

The rapid increase in interest currently being shown in the aquarium hobby is illustrated by information obtained from Mexico and Venezuela. In Mexico, during 1973, five persons were engaged in the production of ornamental fish in outside ponds and in aquaria and these fish were sold to the public through 100 retail outlets (including pet shops, markets and stores). The value of these sales for 1973 has been given as approximately U.S.$ 500 000 per year. During the period 1971/74 a total of 3 238 593 non-native fish was imported into Venezuela for the aquarium fish trade, most of these being brought in from Florida, U.S.A. (Cortéz, 1974).

One of the problems faced by exporters and importers alike is the existence of "pirates" in the trade. From conversations with both of these sectors, it is apparent that a number of dubious practices occur with reference to the shipment of fish. Certain exporters may ship fish in unsuitable conditions, frequently with complete disregard for the norms established by the Government of the country concerned, and this results in heavy losses for the importer; alternatively, the exporters may ship fish in good condition and then find that the importer claims heavy losses on receipt, or that cheques sent in payment are not honoured when presented for collection. This situation has led to the existence of a "black list" of importers and/or exporters among the more reputable dealers, so that the trade can - to a limited extent - help to guard against abuse. Many of the exporters now tend to insist on Bankers' references, or payment in advance, as a protection against loss, and in like vein the established importers also operate on a basis of references before placing orders with non-traditional suppliers.

5.4 Monitoring of Ornamental Fish Imports and Exports

The data given in the Tables in Appendix I give a generalized idea of the type of information which is available on the export and import of ornamental fish between the various countries involved in this trade. The situation with regard to the actual numbers of species which are exported or imported is somewhat more vague and such information as is available is given in Appendix IV of this report.

A number of countries which act as major exporters of live ornamental fish (e.g., Colombia, Peru, Venezuela) require that all exporters shall be in possession of a licence or permit, for which a fee is usually payable to the authorities responsible for regulating the trade. In Peru, for example, a licence costing Per.Sol. 3 000 (approximately U.S.$ 70.00) must be held by each exporter and is renewable on an annual basis. The Government of Colombia has recently enacted legislation in respect to licences and permits for the extraction, movement and exportation of live ornamental fish within and from the country; shipments are inspected at the airport prior to dispatch, to ensure that all the appropriate requirements have been met regarding movement of species from the place of capture to the holding facilities in Bogota ready for shipment.

The sort of information which is required by the Colombian, Peruvian and Venezuelan authorities includes a list of the species to be exported, and the numbers of fish of each species in the consignment ready for shipment. On this basis, it is possible to maintain records of the extent of the trade and the numbers of fish which are exported annually by species. It is known, for example, that the Peruvian ornamental fish export trade basically involves 84 species of Amazonian origin, of which 10 are proving to be of the greatest commercial importance since 1969.

The importation of live ornamental fish is also subject to a system of control in a number of countries and this control is usually exercised by the granting of licences or permits by the competent authorities. It is usual for special customs declaration permits to be completed by the importer or his agent. In the U.S.A., for example, live fish imports are covered by Form 3-177 entitled "Declaration for Importation of Fish and Wildlife", the completion of which is a mandatory requirement as per the regulations of the Branch of Wildlife Permits of the Department of the Interior. Several individual States have additional legislation which prohibits or controls the entry of determined genera and/or species of fish into their territory, and these aspects of control at State level are given in Appendix V to this report.

The Government of the U.S.A. has recently drafted legislation establishing a "clean list" of ornamental fish (i.e., a list of those species of ornamental fish whose introduction may be permitted unless their importation is specifically forbidden by existing legislation) and it is intended that this list shall cover species whose introduction into the U.S.A. is considered unlikely to prove a risk or hazard to native species. The species of freshwater fish included in this "clean list" are given in Appendix VI to this report. The same legislation will prevent the entry into the U.S.A. of the following genera of saltwater fish:

Dasyatis spp.
Daector spp.
Brachirus spp.
Himantura spp.
Inimicus spp.
Pastinachus spp.
Pterois spp.
Plotosus spp.
Synanceja spp.
Taeniura spp.
Trachinus spp.
Thalassophryne spp.

The difficulties and expense involved in the collection and shipment of saltwater ornamental fish, as considered in sections 5.1.2 and 5.3 of this report, have led to suggestions being made by saltwater aquarium enthusiasts in the U.S.A. that certain of the more popular species might be introduced into the waters of Florida. In this way, it is argued, a local source of specimens for the trade would be created, so that these would become available to the public at a lower price than at present. Courtenay and Robins (1973) report that the following species have been included in these proposals:

Pacific anemone fish (Amphiprion spp.)
Royal gramma (Gramma loreto)
Lion fish (Pterois spp.)
Moorish idol (Zanclus spp.)

The same authors report, however, that such introductions are likely to be prohibited under the terms of legislation which it is proposed to enact in the State of Florida.

The Government of Colombia has recently introduced regulations prohibiting the export as "ornamental fish" of adults or juveniles of certain species utilized as food fish in the country, except where such fish are produced on a fish farm. Among the species whose commercialization as ornamental fish on a basis of capture in the wild is prohibited by Resolution No. 942 of 24 July 1974 of the Ministry of Agriculture figure the following:

Colossoma sp.
Arapaima gigas
Brachyplatystoma sp.
Crenicichla sp.
Pimelodus ornatus
Hydrolicus scomberoides
Sorubim lima
Astronotus ocellatus
Cichla spp.
Prochilodus spp.
Phractocephalus spp.
Osteoglossum bicirrhosum
Myloplus sp.
Brycon sp.
Salminus sp.
Pseudoplatystoma spp.

The purpose of this Resolution is stated as being the avoidance of overexploitation which could lead to the elimination of species used as food fish, and any shipments of such fish as "ornamentals" leads to confiscation, fines and cancellation of licences and permits to operate as shippers of ornamental fish in Colombia. Several confiscations have been made at the airport and it can only be stated that the excuses given by the "culprits" show an interesting degree of inventive powers. On

the other hand, where these species are produced on registered fish farms and in accordance with the law, their export as ornamental fish is not forbidden; requirements for the operation of fish farms and for "bodegas" destined for the holding of ornamental fish have been laid down by the Colombian Ministry of Agriculture in Resolutions No. 008 of 17 July 1972, No. 1297 of 14 November 1973 and in a number of supplementary documents published by the Institute for the Protection of Natural Resources (INDERENA).

Whilst it is not the object of the present report to attempt any consideration of the ecological or conservation aspects of "exotic" fish introductions, it is of interest to note that a number of ornamental species have been found to establish viable populations in the waters of Florida (Courtenay and Robins, op. cit.), and many of the species which have now become established were originally released accidentally or on purpose as a result of escapes from importers' holding facilities, by disenchanted aquarists, etc. Courtenay and Robins give the following list of ornamental species for which established populations now exist in Florida:

Species	Common Name
Anabas testudineus	Climbing perch
Betta splendens	Siamese fighting fish
Colisa lalia	Dwarf gourami
Ctenopoma nigropannosum	Two-spot climbing perch
Helostoma temmincki	Kissing gourami
Macropodus opercularis	Paradise fish
Trichogaster trichopterus	Blue gourami
Astronotus ocellaris	Oscar
Cichlasoma bimaculatum	Two-spot cichlid
C. octofasciatum	Jack Dempsey
C. cyanoguttatum	Rio Grande perch
C. meeki	Firemouth cichlid
Geophagus brasiliensis	Pearl cichlid
Tilapia aurea	Blue tilapia
T. melanotheron	Black chin tilapia
T. mossambica	Mozambique tilapia
Hemichromis bimaculatus	Jewel fish
Clarias batrachus	Walking catfish
Barbus conchonius	Rosy barb
B. gelius	Golden barb
Barbus sp. 1/	Tinfoil barb
Brachydanio rerio	Zebra danio
Carassius auratus	Goldfish
Cyprinus carpio	Carp
Hypostomus sp.	Armoured catfish
Belonesox belizanus	Pike killifish
Mollienesia sp. 2/	Black molly
M. latipunctata	Broad-spotted molly
M. sphenops	Liberty molly
Molliencsia spp.	(Hybrid mollies)
M. petenensis	Swordtail molly
Lebistes reticulatus	Guppy
Xiphophorus helleri	Swordtail
X. maculatus	Platy
X. helleri x X. maculatus	Red swordtail
X. variatus	Sunset platy
X. xiphidium	?

Prior to 1972, importers, wholesalers and retailers of ornamental fish, as well as fish farms producing such fish, were not required by Florida State law to have a licence to cover these activities. At the present time, however, all such persons are required to be in possession of a licence issued by the Florida Game and Fresh Water Fish Commission. The main purpose of this licence is to provide some measure of control over any possible escapes or deliberate release of "exotic" fish into the waters of the State, and the law empowers biologists from the State government to inspect establishments which import, hold, produce and/or sell ornamental fish.

1/ ? possibly Barbodes schwanenfeldi (Bleeker)
2/ Thought to be a hybrid M. latipinna x M. velifera

With reference to the situation in the U.S.A. as a whole, Lachner, Robins and Courtenay (1970) have reported on the presence of reproductive populations of a number of ornamental fish species, many of these populations having been derived from releases ("dumpings") or escapes from aquaria or dealers' establishments.

It is apparent, therefore, that a number of species native to African, Asian and Latin American waters respectively, have established breeding populations on the North American continent, particularly in Florida which has a climate suitable for their breeding. Courtenay and Robins (1973) cite the case of adult pike cichlids (Crenicichla sp.) which were present in a shipment of cichlids sent to a Miami importer in 1971, and report that the release of the former species was only prevented by their timely impoundment by biologists of the Florida Game and Fresh Water Fish Commission. Moe (cited by Lachner, Robins and Courtenay, 1970) has drawn attention to the fact that juvenile piranas are frequently included in shipments to Miami of "harmless" or herbivorous characins such as Colossoma spp. or Metynnis spp. to which they bear a close superficial resemblance; the situation is further complicated by the fact that the increasing use of tranquillizers (see section 5.2 above) impedes the ready distinction between desirable and undesirable species included in a shipment by untrained personnel in the country of destination. Instances have occurred of piranas being shipped from Colombia as Metynnis spp., specifically to a European country, and on their being confiscated as a species whose export is prohibited; the exporter concerned alleged that they were exported in this way because the importers wouldn't know the difference between the two.

Perhaps the classical example of the way in which an ornamental fish has become distributed throughout the world is that of the goldfish, an eastern Asian species which is now found in ponds, streams and lakes in many countries to which it is not native. Concern regarding the possible deleterious effects on the native fish fauna of the introduction of "exotic" species has been expressed by biologists in a number of other countries, among which are included Argentina, Brasil, Colombia and New Zealand. A similar situation exists with reference to saltwater fish and the subject of marine fish introductions has formed the basis for a special report by the International Council for the Exploration of the Sea (ICES, 1972).

Although there is adequate evidence of an increasing degree of interest in the monitoring of exports and imports of ornamental fish, it is also possible that this may have a connexion with fees and tariffs just as much as a desire to protect the natural resources. In general terms, information on resource appraisal is non-existent. A report relating to the interinsular trade in fisheries products (Indonesia, 1973) estimates that in the year 1971 the ornamental fish potential of the island of Jambi was 30 million individuals. The situation in South America gives cause for increasing concern and even in 1958 there was evidence of overexploitation of fish stocks. In that year collectors and exporters of ornamental fish in Guyana were complaining to the authorities that "they have to go much further afield to obtain the species desired and the numbers available in many creeks are stated to be much reduced" (Report, 1958). The Guyana Fisheries Division initiated an investigation into the ornamental fish trade and made a number of recommendations and proposals with the object of initiating a better control system and of improving all aspects of this trade. There is little evidence of control measures being taken to protect natural stocks of saltwater fish and the only evidence which has come to hand is that the Government of Belize imposes a maximum export limit of 750 lb (340 kg) per year - this figure presumably referring to the F.O.B. weight of the pack (Charnock-Wilson, personal communication, 1974). The Government of Colombia is at present initiating a research programme designed to study the potential for the saltwater species of possible value as ornamental fish, particularly in relation to the adoption of measures to prevent the overexploitation of the natural stocks in the Caribbean. A report on the laws and regulations governing the international trade in live fish and fish eggs has been published by FAO (Zenny, 1969).

5.5 Mortality and Disease

One of the principal causes for concern at all levels of the ornamental fish trade is the occurrence of mortalities and disease in the stock; the economic effects of these problems can frequently be very severe indeed. Taking as a typical example the situation as it exists in Peru, reliable information indicates that the following mortality figures are commonly experienced:

Stage in the operation	Average mortalities (%)
Capture by native fishermen and transportation by canoe to the exporters' holding facilities in Iquitos	30
Maintenance in the exporters' holding facilities in Iquitos and preparation for dispatch	10-20
Transportation to destination (e.g., Florida, U.S.A.)	10-20

The foregoing figures indicate that Amazonian fish of Peruvian origin are subject to mortalities ranging from 50 to 70% between capture in situ and arrival at their final destination abroad. This fact suggests that, in order to provide the approximately 14 million ornamental fish sent from Peru in 1970, it would have been necessary to capture at least 28 million individuals at source (assuming the lower mortality figure of 50%). The situation in Colombia is very similar, and mortalities between capture and shipment from Bogota are currently estimated at approximately 60%. Axelrod (1973) states that losses in the region of 20% are "usual and tolerable" in shipments received from abroad in the U.S.A. and this statement suggests that similar problems might be experienced by several of the countries from which live ornamental fish are exported. The mortality rates in shipments are likely to be increased when the aircraft in which the fish are being transported is delayed on account of inclement weather, or when it is necessary for the fish to be trans-shipped during transit.

Many of the mortalities which occur between the time of capture of the fish and the moment of delivery at the exporters' holding facilities can be attributed to injuries received during capture, maintenance of the specimens in overcrowded conditions, prolonged exposure to heat and insolation, asphyxia, use of metal containers (e.g., zinc) to which river water with a low pH is added, etc. The 70% or so of the fish which do reach the holding facilities alive obviously arrive in a stressed condition and, being debilitated, are therefore more susceptible to the effects of bacterial, mycotic and parasitic infections and infestations. The occurrence of these types of diseases is common in many of the shippers' facilities and there can be little doubt that the problem of disease is one which constitutes a factor capable of limiting the development of a viable ornamental fish export industry.

At the present time, in cases where any medication at all is used, there is a tendency for ornamental fish exporters and importers alike to put blind faith in the efficacy of compounds, such as acriflavine, malachite green, methylene blue, etc. Compounds such as these are usually added in an ad hoc or empirical manner until the "right colour" has been imparted to the water, in the opinion of the exporter. Other shippers make use of antibiotics, particularly tetracyclines and chloramphenicol, a practice which, although it may help to control mortalities due to certain types of bacterial infection, cannot be considered ideal; further consideration will be given in this report to the control of infectious diseases of ornamental fish in the Discussion and Recommendations. It is worthy of mention, however, that the Colombian authorities have recommended that compounds of little or doubtful efficacy should not be used in connexion with ornamental fish disease control and in fact only the use of compounds whose efficacy has been demonstrated by the National Fish Pathology Service is approved.

Although a modest amount of knowledge has been accumulated regarding the main diseases which affect species of freshwater ornamental fish, it must be taken into account that saltwater aquarism is a more recent development. For the same reason, the diseases which affect saltwater species are even less well known or understood than those of the freshwater varieties. Importers of saltwater fish have become aware, frequently through bitter and expensive experience, that certain groups of fish are highly susceptible to particular diseased conditions. Thus it is common knowledge, for example, that acanthurids and pomacentrids (particularly species of Amphiprion) are subject to oodiniasis, whilst certain chaetodontids, scatophagids and syngnathids are prone to parasitic infestations (e.g., Benedenia sp.).

A fact which is not always fully appreciated by dealers and aquarists is that many of the more common diseases of freshwater fish have their counterpart in the marine environment. The following are just a few examples of this "counterpart" situation as it concerns ornamental fish:

Freshwater	Saltwater
Aeromonas spp.	Vibrio spp.
Cytophaga spp.	Sporocytophaga spp.
Oodinium pillularis	Oodinium ocellatum[1/]
Ichthyophthirius multifiliis	Cryptocaryon irritans
Gyrodactylus spp.	Benedenia spp.

1/ Currently classified as Amyloodinium ocellatum

One of the favourite "standbys" of the saltwater aquarist, particularly for the treatment of cases of oodiniasis, is copper sulphate. Used at the correct doses (in terms of ppm Cu) this can be effective in practice, but it is common for copper compounds to be sold nowadays as chelated copper, thus helping to prevent toxicity problems due to variance in the hardness of the water in which they are used.

At the time of writing (April 1975) there appears to be no well defined fish disease certification system operated by governmental authorities for shipments of live ornamental fish. In Peru, a visual inspection of such shipments is made prior to dispatch by biologists of CERPER, Empresa Pública de Certificaciones Pesqueras del Perú, the organization with statutory authority to undertake such inspection and certification (Anon., 1972). During the Intergovernmental Consultation on the Convention for the Control of the Major Communicable Diseases of Fish (FAO, 1974), the delegation from Colombia - the principal supplier of live ornamental fish in Latin America - proposed that an International Fish Health Certificate for Ornamental Species be prepared; this proposal is indicative of the serious interest being shown by the countries for which the export of such fish represents an important commercial activity.

The U.S.A., as the main importer of ornamental fish, is also expressing interest in the diseases which affect these species, and more especially with regard to the diseases and/or parasites which may prove harmful to the native fish fauna if accidentally introduced from abroad. A Fish Disease Control Act, termed Bill S.2764, was introduced before Congress in 1971, but is currently awaiting approval in the original or in an amended version. The terms of this Bill would authorize the Secretary of the Interior to draw up regulations designed to protect the marine and freshwater fisheries of the U.S.A. against the introduction and dissemination of fish diseases. Considerable opposition to the terms of this proposal was generated by sectors of the U.S. ornamental fish trade and it was suggested that the implementation of the provisions of the Bill would signify the financial ruin of the industry. Among the arguments advanced by opponents of the Bill was the suggestion that certain common diseases of ornamental fish (e.g., argulosis, chilodiniasis, fin rot, ichthyophthiriasis, saprolegniasis, etc.) already occur naturally in U.S. waters, and that it is therefore unlikely that any undue damage would be caused. According to the proposals of this Bill, any diseased fish would be confiscated and destroyed by the authorities, although compensation would be payable by the Department of the Interior. The State of California (California, 1971) also has a Fish and Game Code which prohibits the shipment or receipt of "infected, diseased, or parasitized fish, amphibia, or aquatic plants" for the purpose of propagation. The same law also prohibits the introduction of molluscs and crustaceans in cases where these "are or may be placed in the waters of the State" - a precaution which would also help to avoid the introduction of potential vectors of certain types of parasites which continue their life cycle in fish. The provisions of this law are given in Appendix VII of this report. Although these do not refer specifically to ornamental fish, the terms of the provisions are informative.

The New Zealand authorities require that all imports of "tropical fish" be kept in quarantine for a period of two weeks before being cleared for entry into the country. During this quarantine period the fish are examined for the presence of diseases or parasites and any fish found to be so affected are destroyed. The importation of "tropical fish" which could establish breeding populations in New Zealand waters is also forbidden.

Under the terms of the South Australian Fisheries Act 1917-62, the State authorities are empowered to impose a quarantine control on fish which have been imported from abroad, but no such requirements apply to imports from other Australian states. These disease inspection and quarantine measures to not apply to imported "aquarium fish", however, and dealers exercise a voluntary control system in that they only handle species which are approved by the Commonwealth/State Conference Exotic Fish Sub-Committee, as given in the "List of Exotic and Indigenous Aquarium Fish".

The importance of fish diseases is becoming more widely recognized by exporters and importers of live ornamental species, especially in so far as these diseases have serious and adverse effects on the financial gains and commercial "prestige" of both suppliers and dealers alike. Several European importers, for example, have desisted from placing orders with individual suppliers in Latin America because past experience has shown that shipments from those sources frequently arrive in a diseased or heavily parasitized condition. Suppliers of saltwater ornamental fish are currently showing particular concern with regard to the presence of diseases and/or parasites, and many of the more reputable dealers and exporters carry out regular visual inspections of their stocks before shipment, in an attempt to create and maintain a good reputation for healthy fish among the importers who purchase from them. Advertisements placed in the trade journals often place great emphasis on the provision of "disease-free" saltwater fish, a factor which is an important selling point with wholesalers, retailers and hobbyists. In view of this increasing concern with fish diseases, it is difficult to understand how certain opponents of Bill S.2764 in the U.S.A. should have voiced the opinion that the trade is quite capable of acting as its own "policeman" without the need for any "interference" from the authorities.

In strictly practical terms, the uncontrolled importation and exportation of live ornamental fish does pose a number of problems with regard to the possible introduction of fish diseases. As has been pointed out in section 5.2 above, many exporters ship their fish in water taken from ponds, streams and rivers of questionable biological and bacteriological quality. The principal danger lies in the practice, common in the trade, for the water in which incoming fish have been received to be disposed of in an untreated state through channels or conduits in the floor. Although in urban areas this effluent usually enters the public sewage system, in rural areas it is common for the effluent to enter directly into open ditches or streams. In the event that organisms, potentially pathogenic to fish or aquatic plants, should be present in the incoming water, these organism could thereby gain access to open waters in the country of destination. The same consideration holds true for live fish, which may be introduced via unscreened pipes in the importers' reception facilities to the new local environment. This problem would be compounded in cases where the fish are diseased or parasitized. Whilst it holds true that several of the more common fish parasites are also known to occur naturally in regions other than those to which the imported fish are native (e.g., Saprolegnia spp., Ichthyophthirius multifiliis, Argulus spp.), the danger is the possibility of "exotic" strains of these parasites being introduced and, in this way, causing epizootics among members of the native fish fauna of the waters into which they were accidentally introduced.

The seriousness of this problem is becoming ever more appreciated by the more responsible shippers and in Colombia several of the shippers dispose of water in which batches of fish have been received from collection centres in the country (e.g., Leticia, Puerto Gaitán, Puerto Inirida) prior to transferring the fish to aged water obtained from the Bogota public drinking water system. In most cases, the outgoing water is treated with halogens prior to being discharged into the public sewage system and this practice should be encouraged.

5.6 Aquaculture and Ornamental Fish

As has been briefly mentioned in sections 3, 4.1 and 5.3 of this report, there is evidence of an increasing reliance on aquaculture techniques as a means of producing sufficient numbers of many of the more popular species of ornamental fish to satisfy the continued requirements of the trade. Goldfish have been bred traditionally in ponds in the Far East for centuries and through the use and application of aquaculture practices it is now possible for suppliers in Asia to provide wholesale shipments of species native to Latin America at competitive prices on the world market. Thailand, which is rapidly becoming a major supplier of ornamental fish, is now in a position to satisfy 20% of her exports through the use of locally-bred fish. Alternatively, certain Asian species such as fighting fish (Betta splendens), paradise fish (Macropodus opercularis), etc., are being successfully produced in parts of Latin America to satisfy the demands of the local market.

An appreciable number of ornamental fish species are reared on fish farms in Florida, U.S.A., for the domestic market and the rearing of "aquarium fish" on a commercial basis is practised quite extensively in European countries, such as the Federal Republic of Germany. It is interesting to note

that most of the fish farmers in Florida tend to specialize in the production of one or two specific varieties of Asian and/or Latin American fish. The following list covers the principal species of ornamental fish which are currently reared on a commercial basis in aquaria and fish farms:

Aphyocharax rubripinnis
Anoptichthys jordani
Hyphessobrycon callistus
H. flammeus
H. ocellifer
H. pulchripinnis
H. rosaceus
H. serpae
Hemigrammus gracilis
Gymnocorymbus ternetzi
Thayeria obliqua
Aplocheilus panchax
Pterophyllum scalare
Aphyosemion australe
Epiplatys chaperi
Jordanella floridae
Oryzias latipes
Fundulus chrysotus
Nothobranchius sp.
Lebistes reticulatus
Mollienesia spp.
Xiphophorus spp.
Callichthys spp.
Corydoras spp.
Astronotus ocellatus
Hoplosternum thoracatum
Apistogramma ramirezi
Cichla spp.
Cichlasoma spp.
Carassius auratus
Cyprinus carpio
Tanichthys albonubes
Puntius nigrofasciatus
P. oligolepis
P. titteya
P. tetrazona
P. schuberti
P. everetti
P. hexazona
P. lineatus
P. filamentosus
P. lateristriga
P. arulius
P. candens
P. hulstaerti
Rasbora maculata
R. heteromorpha
R. pauciperforata
R. dorsiocellata
R. borapetensis
Brachydanio rerio
B. albolineatus
Hyphessobrycon innesi
Betta splendens
Trichogaster trichopterus
T. leeri
Ctenops pumilus
Dermogenys pusillus
Pristella riddlei

The foregoing list of freshwater fish suitable for the aquarium is not complete and is intended merely to show the more popular species which are currently produced on a commercial basis. Commercial breeders also have a tendency to specialize in the rearing or cultivation of ornate strains and varieties, including hybrids, of particular species (e.g., guppies, mollies, platies). Several such breeders base their business on the production and sale of such specialized items to wholesalers under the terms of a contract. Apart from an obvious need for knowledge and experience of the breeding habits and biology of a particular species of fish, the fish farmer must carry out a market survey to ensure the success of his enterprise, in cases where the desired species can be bred successfully in captivity. Several unexpected problems can arise; for example, attempts to breed lemon tetras (Hyphessobrycon pulchripinnis) have not always proved as successful as was originally hoped, due to the fact that the offspring tend to show a silvery coloration rather than the yellowish hue of the parent fish. Commercial considerations are important if this type of aquaculture is to be successful, so that (for example) a European fish farmer wishing to produce characins of a determined species would need to provide fish at a price which would be competitive for that charged by South American shippers of wild-caught specimens. Considerations such as these are of vital importance to the successful commercial development of ornamental fish through aquaculture, and explain why many of the fish farmers prefer to specialize in the rearing of a limited range of highly-priced species. The supply of saltwater aquarium fish is not likely to be based on aquaculture for some time to come, since the only species which have been bred successfully in captivity in the aquarium are the clown fish (Amphiprion percula), the neon goby (Elacatinus oceanops) and the pygmy sea horse (Hippocampus zosterae).

Axelrod et al. (1969) give some interesting data with reference to the production of ornamental fish in the U.S.A. It is stated that a pair of oscars (Astronotus ocellatus) will breed continuously and provide an average of 25 hatches per year; at 1969 prices of U.S.$ 0.25 per juvenile, it was calculated that this activity alone would yield at least U.S.$ 3 000 per year. A number of interesting considerations relating to the large-scale breeding, rearing and production of disease-free inbred strains and hybrids of ornamental fish in pools and aquaria in the U.S.A. have been reported and analysed by Axelrod (1973a). This author cites the example of an operating fish farm in Florida with 100 ac (40.5 ha) of land, provided with several sources of deep (more than 150 m) well water to supply 500 pools measuring 25 x 100 x 12 ft (7.6 x 30.5 x 3.6 m), each of which was calculated to yield up to 10 000 fish per year. This farm was available on the market for U.S.$ 250 000 or less at that time. Axelrod suggests that the total cost of producing "standardized, uniform, healthy mature swordtails or platyfish" would work out at less than U.S.$ 0.50 per fish. With reference to the production of ornamental fish in aquaria, he gives the example of a 10-gal (approximately 45-l) tank equipped with an individual heating and filtration system, the cost of which would be around U.S.$ 25.00; such an aquarium, suitable for the maintenance of 25-100 mature livebearers, would cost approximately U.S.$ 4.35 per year to run, in terms of filtration media, foods, electricity and depreciation (exclusive of overheads), i.e., an average cost of U.S.$ 0.085 per fish per year.

The majority of livebearing ornamental species produce up to 40 young per month, and, on the assumption that most aquarium fish mature within 4-6 months, Axelrod (1973a) suggests that up to 6 inbred generations could be obtained in under 3 years. A further interesting fact which he cites is that certain rivulins mature in 3 months and produce eggs which can be stored for several months (or until required) for reproduction purposes. The benefits of genetic selection and inbreeding of the stock are numerous in the case of many species of ornamental fish (e.g., goldfish, guppies, platies, etc.). Axelrod et al. (1969) have drawn attention to the advantages of this specialized form of aquaculture and state that "some of the livebearing fish sold in England and Europe are produced in Singapore and Hong Kong. These fish are small and cannot compare to the American-produced fish in size, variety, or colour".

It has not been possible to obtain reliable data on the financial aspects of goldfish raising in Asia, but information from the U.S.A. (Meyer et al., 1973) indicates that the production of goldfish in the State of Arkansas gave a gross return of U.S.$ 660 per acre (0.4 ha), and a net return of U.S.$ 535 per acre, in the year 1970. These figures relate to the production of goldfish of the preferred market size (in the U.S.A.) of 3.75-5.00 cm. In Italy, the production of market-sized goldfish of 6-8 cm takes up to 2 years.

The increasing interest being shown in the utilization of aquaculture as a basis for the production of ornamental fish of commercial value is shown by a statement contained in the Report of a Seminar on Aquaculture in Southeast Asia, held in 1973 (Report, 1973) and which statement reads textually:

"New Prospects in Aquaculture

Aquarium Fish: Aquarium fish trade is one of the most profitable aquaculture enterprises in many southeast Asian countries, mostly involving collection from wild stocks rather than culture. Nets, traps and chemicals, such as sodium cyanide, are used for the capture of aquarium fish. Some countries have succeeded in breeding highly-prized indigenous and exotic species, but more work is needed in this field for freshwater and marine species. The demand for aquarium fish continues to grow rapidly.

There is a need for intensified research into the breeding biology and ecology of marine and freshwater aquarium species. This is a particularly promising field for research centres and universities. Results from such studies could also be applied to food fishes. Collecting, storage and transportation methods need further investigation. Also there is a great potential for research on selective breeding of aquarium species."

The foregoing statement, quoted verbatim, is illustrative of the interest and concern currently being expressed with regard to the production of ornamental fish as a source of revenue for the developing nations. The Government of Colombia has similarly recognized the importance of aquaculture for the production of certain species of food fish which are frequently exported as ornamental fish. The Colombian Ministry of Agriculture has issued Resolution No. 942 of 24 July 1974 prohibiting the sale of wild-caught fish of certain species in the ornamental fish trade, so that these species can only be legally exported if produced on a registered fish farm. The production of such fish by means of aquaculture techniques is thus intended to protect the natural resources from overexploitation and at the same time to satisfy the demands of the commercial market for important species such as sapuara (Prochilodus spp.).

6. DISCUSSION AND GENERAL CONCLUSIONS

In a report such as the present one, it is not feasible to provide an exhaustive analysis of each and every aspect of the ornamental fish trade at a worldwide level. The intention of the writer has, therefore, been to offer a general outline of this important commercial activity and to recommend a series of improvements or modifications to existing techniques in relation to certain of the main problems and means whereby these might be overcome.

Any attempt to evaluate the extent of the ornamental fish trade encounters one particular difficulty, namely the lack of a uniform method of recording and reporting both the volume of exports and imports, and the monetary value of the same; similarly, it is often difficult to discover what the exact nature of the commodity is. Certain countries (e.g., Peru) have established a useful system for reporting the numbers of live ornamental fish which are exported, whilst others (e.g., the U.S.A.) are able to provide equally valuable records on the volume and value of live ornamental fish imports. From the official information provided by these two countries, it is possible to determine with a fair degree of accuracy the countries to which the fish are shipped, or from which they have been received. The Standard International Trade Classification (SITC) used by Malaysia includes "fish for aquaria" under heading 031-120, and the Mexican authorities designate "live fish except for reproduction" (? ornamental fish) under the heading 0 301A 012.

The lack of uniformity with regard to the way in which the volume of shipments is reported may best be illustrated by the practice of some countries (e.g., Australia, Brazil, Colombia, Cyprus, Guyana, Malaysia, Mexico, Peru, U.K., U.S.A.) of giving the numbers of fish, and of other countries (e.g., Belgium, Federal Republic of Germany, Indonesia, Philippines) of giving the weight (? F.O.B.) expressed in kg, tons, metric tons, or even hundredweight (e.g., Sri Lanka).

It is suggested that the most desirable method for recording the movements of ornamental fish would be for the numbers of each species per shipment to be declared on a standardized form used in the countries of origin or from which the shipments are made. The practical implementation of this suggestion would not be without initial difficulties, due in part to the fact that exporters tend to make an overcount of approximately 10% (Axelrod, 1973a). In countries where limitations are imposed on the amount of fish which may be exported, on species to which restrictions apply (e.g., species protected by conservation laws, etc.) or, indeed, where tariffs and dues are payable in relation to the numbers of fish which are exported, the maintenance of accurate records may be subject to a certain degree of abuse. The possibility of abuse is not confined solely to the exporting countries, and concern has recently been expressed in the U.S.A., a major importer of ornamental fish, with reference

to the falsification or inaccurate completion of the Customs and Interior Department's Form 3-177 "Declaration for Importation of Fish and Wildlife", in terms of species descriptions and deflated costs (Axelrod, 1973a). Clearly, there is an urgent need for greater control to be exercised in the matter of accurate maintenance of records.

The practice of reporting the volume of exports and imports in terms of F.O.B. weight alone is unsuitable as a basis of records, since these figures would include the total weight of the fish, plus the water and packaging used in shipment. As stated in section 5.3 of this report, it is usual for the prices of ornamental fish to be quoted at source in U.S.$. For this reason, it might be practicable for all records of the value of exports and imports of ornamental fish to be quoted in U.S.$, together with the monetary value in local national currency. Official Peruvian records adopt this practice and it should not be too difficult for other countries to quote the exchange rates of their currency with regard to the U.S.$ for the period to which the record applies, possibly as a footnote to the corresponding Table.

In order that the foregoing suggestion can be successfully implemented in practice, a number of requirements would need to be satisfied. Foremost among these is that the species (or varieties) included in each shipment of ornamental fish shall be correctly described in invoices and customs declaration forms, etc., and that the number of each species shipped is accurately reported. This presupposes that an adequate system of inspection can be put into operation in each country from which shipments are made. It also presupposes that the authorities of the importing countries will be interested in checking the shipments, as would be the case with regard to species they may consider harmful to their own aquatic biota in the event of accidental release, etc. Such a system would require the presence at the port or ports of dispatch and entry, respectively, of inspectors with a suitable training in the recognition and identification of ornamental fish species. For such a system to be practicable, it is clearly both desirable and necessary that qualified biologists be available, since it is only in the most unusual circumstances that customs inspectors are able to identify genera or species of ornamental fish with any degree of certitide.

One difficulty which is likely to be encountered in the implementation of a system of inspection is that many of the native species of fish in certain countries are poorly known and this situation also applies to many of the species of saltwater fish likely to be of interest to the ornamental fish trade. Such problems could be overcome by the publication of a manual describing the known species of fish which are shipped on a commercial basis. Such a manual might be of a loose-leaf variety, enabling amendments or additions to be added as appropriate; the information given should include the scientific and common names of the species concerned (together with an English name if known) and preferably a photograph or line drawing. The distinguishing characteristics of potentially undesirable species such as piranas (Pygocentrus spp., Rooseveltiella spp., Serrasalmo spp.) could be given, so that suspected piranas can be readily recognized and distinguished from harmless characins which they may closely resemble (e.g., Colossoma spp., Metynnis spp.). A number of the more reputable shippers of ornamental fish make reference in their catalogues and price lists to the number for the species given in certain commercially-available illustrated loose-leaf manuals of ornamental fish, and this practice is of great utility to potential customers as it enables the species offered to be "checked" prior to placing an order. It is desirable that a standard system of recognition such as this be more widely used in the trade; in the same way, the identity of species shipped could be more easily checked by inspectors and customers alike.

The adoption of the suggestion given above would facilitate, on a short term basis, the inspection of shipments at source and at destination. It becomes patently obvious, however, that final responsibility for the inspection and certification of shipments of live ornamental fish should lie with the Fisheries Department or Division of the Government concerned, either directly or through close liaison with the customs authorities. An additional recommendation would be that the number of ports for dispatch and receipt of ornamental fish should be limited. Lachner et al. (1970) have stated, for example, that in 1969 there were 279 ports of entry in the U.S.A.; in this context the American Fisheries Society recommended that the U.S. Government limit the number of ports of entry and establish four Federal Fish Disease and Fish Culture Stations in, or near, Miami (Florida), Tampa (Florida), Los Angeles (California) and New York (New York) - the areas where most of the ornamental fish importers and dealers are situated - with the object of inspecting shipments of live ornamental fish received into the U.S.A., identifying the species involved and controlling any disease problems which may be found in the shipments. In Peru, shipments of ornamental fish were formerly made from Lima, but a number of such shipments are now being sent directly from Iquitos, and for this reason the Peruvian authorities have established an office in this latter town to ensure compliance with reporting and registration requirements by the shippers concerned.

A further very important suggestion which would assist the authorities to maintain control over the activities of collectors, shippers, importers and dealers alike, is that all such persons or organizations shall be in possession of a licence or permit granted by the Government agency concerned. This policy has been, or is in the process of being, introduced in countries such as Colombia and Peru, which are important from the point of view of the supply of ornamental fish to the world market. It must not be assumed that the imposition of licensing requirements is of necessity a procedure which benefits the authorities exclusively; the policy of the Government of Colombia is that INDERENA, as the authority responsible for all matters relating to fisheries and the exploitation of natural aquatic resources, shall provide technical assistance to the ornamental fish trade on matters such as fish disease control, better methods of maintenance and shipment, etc., all of which are clearly of direct benefit to the exporters. Similar restrictions are being considered in countries involved in the importation of ornamental fish; the American Fisheries Society recommended that a policy be adopted in the U.S.A. to the effect that no live ornamental fish may be imported into that country except under a Federal licence or permit issued to the dealer[1/]. Under the terms of this recommendation, only duly licensed dealers would be permitted to import ornamental fish for sale or distribution to aquarists and these dealers would be subject to regular inspection by the competent authorities to ensure that regulations on disease control, effluent disposal, prevention of "escapes", etc., are being complied with.

The question of resource appraisal in relation to the continued supply of wild-caught ornamental fish is one which raises a number of questions. In the first place, one has to consider the possibility of certain species being endangered by overexploitation and concern has already been expressed by collectors in South American countries over the "disappearance" of many popular aquarium fish from areas in which they were previously numerous and could be captured in large numbers. Although suspicions exist that certain South American species (e.g., Acquidens curviceps) might be threatened with virtual extinction because of overexploitation via the ornamental fish trade, Miller (1971) has provided concrete evidence with reference to Arapaima gigas in the following terms:

"distribution : throughout Amazon and much of Guyana.

status : depleted (apparently has been decimated in the Rio Negro above Manaus, and in a huge area around Belem do Pará).

reasons for decline: overfishing, taking of young (easy to locate and capture by killing parent) for aquarium trade.

measures proposed : aquarium trade in young fish should be prohibited."

Miller (op. cit.) also refers to a number of South American annual fish (Cynolebias spp.) which are known from isolated localities, but on the positive side quotes the example of Simpsonichthys boitenei, an annual fish whose present distribution is limited to a temporary pool at Goyas, in Brasil; Miller reports that aquarium enthusiasts in America and Europe had expressed interest in S. boitenei, but have been unable to obtain specimens. Miller suggests that as an annual fish, S. boitenei "would make an excellent aquarium fish", and thus provides an illustration of how a comparatively rare species might be either made extinct through removal from its natural environment (negative approach) or might form the basis for a specialized type of aquaculture supplying the ornamental fish trade (positive approach). The present availability of Plecostomus spp. through the shipment of wild-caught specimens in South America only manages to satisfy approximately 20-30% of the demand imposed by the trade and as this genus has not so far been successfully bred in captivity, there is a possibility of stock depletion through overexploitation.

It has already been pointed out (section 5.5 above) that losses due to mortality and disease mean that at least twice the number of fish which are actually exported from parts of South America must be actually caught in order to satisfy the commercial demand of the trade. The Peruvian ornamental fish trade involves approximately 80 species, of which 30-40 (mainly catfish and characins) could be described as "popular" aquarium fish. Under pressure from commercial interests, it is not difficult to appreciate how certain species are more sought after than others. One question to which no satisfactory answer can be given at present refers to the fate of the "unwanted" fish which are caught at the same time and in the same haul as the "desirable" species. It must be borne in mind that several species, as much "unwanted" as "desirable" ones, only occur in this area of the world and the need for proper biological investigation becomes serious if overexploitation is to be avoided.

1/ Defined as "a firm or person whose income derives from live ornamental fishes"

When the figures given in this report are considered, it is apparent that Latin America supplies approximately one third of the live ornamental fish imported annually into the U.S.A. The greater majority of these fish are wild-caught and aquacultural practices are limited to the 15 or so species which can currently be bred in captivity. The areas of South America which possess a fish fauna containing species of actual or potential interest to the ornamental fish trade are those embracing the River Amazon and its tributaries, the River Orinoco and its tributaries and the River Plate-Paraná system.

As a direct result of research being conducted by biologists, it is apparent that other areas of South America not traditionally exploited by ornamental fish collectors have a tremendous potential for development, always provided that these resources can be satisfactorily monitored to help prevent overexploitation. A recent publication by Mago (1971) refers to the fish fauna of the River Casiquiare, Venezuela, the communication between the Amazon and Orinoco watersheds; Mago sampled 6 000 specimens, corresponding to 80 genera and 27 families, and of which a large number are varieties sought after by the ornamental fish trade. A further publication by the same author (Mago, 1973) reports that 151 different species of ornamental fish are found in the Amazonian region of Venezuela, an area which covers 176 000 km^2 of that country. It is fitting, therefore, that comprehensive research programmes be organized to study many aspects of the biology and population dynamics of those species of fish which are potentially of importance and interest to the trade. Latin America should be given first priority with reference to this type of biological research programme, bearing in mind that practically all of the ornamental fish exported from this region are based on the capture of specimens in the wild. Many of the shipments from Asia are of fish which have been reared in captivity and at the present time the volume of ornamental fish exports from Africa is much less than is the case of South America.

A further most important subject for consideration and one which is increasingly being recognized as such, refers to the control of ornamental fish diseases. The need for competent technical assistance in the recognition, prevention and control of aquarium fish diseases for the developing countries is a very real and pressing one. It is apparent that there are not enough biologists with training in fish pathology and experience of the fish disease problems occurring in the countries concerned to provide the degree of assistance which is necessary. The present situation, at least as far as Latin America is concerned, is that the ornamental fish shippers place a blind faith in the use of substances such as acriflavine and methylene blue, or on imported commercial products, usually without any understanding of the nature of the disease(s) or of the correct method of using such products. The ready availability of antibiotics and sulphonamides has led to these being used in a "shotgun" manner by many of the shippers, most of whom tend to believe that these compounds constitute a panacea as far as all ornamental fish diseases are concerned.

A summary of the salient practical and economic aspects of ornamental fish diseases in relation to the trade has been given at the First Latin American Symposium on Aquaculture, organized by FAO in Montevideo (Uruguay) in 1974. Observations made by biologists trained in fish pathology have shown that bacterial infections, and endo- and ectoparasitic infestations are extremely common among ornamental fish in several countries of South America. Once it has been accepted that fish diseases constitute a significant contributing factor to losses and mortalities among ornamental fish shipments, the next obvious step is to introduce measures designed to prevent and control these diseases. A recent publication by Trust (1972) has provided firm evidence as to the inefficacy of a number of liquid preparations marketed commercially for the prevention and treatment of many bacterioses affecting ornamental fish in aquaria. This worker carried out standard bacteriological and bioassay tests on 14 such products sold commercially, including preparations manufactured in Canada, the Federal Republic of Germany, the U.K. and the U.S.A. The activity of the products was studied *in vitro* against a number of bacterial fish pathogens, and *in vivo* with goldfish and guppies. The results led Trust to make the following conclusions:

(i) "It is apparent that the products tested in this study would prove inadequate for the therapy and prophylaxis of bacterial infections of fish. Even in the absence of significant amounts of organic material, the products were unable to reduce the modest viable bacterial counts in the bioassay aquaria water. Concentrations of the products that were bacteriostatic or bactericidal were markedly higher than the recommended concentrations. These concentrations were likely to be toxic for fish."

(ii) "The most convenient method of use of these formulations, and that recommended by the manufacturers, is the addition of the formulation to the aquarium water. There is little evidence, however, that this method has proved effective in systemic infections of fish. Treatment of such infections generally requires that the antibacterial compound be administered orally or parenterally. Addition of antibacterials

to the water is likely only to limit the growth of the bacterial flora in the aquarium and may reduce the bacterial numbers in lesions on the surface of the fish. Control of this bacterial growth in the water may be complicated by the presence of sand, plants and food; since these will reduce the efficiency of the disinfection either because of the direct inactivation of the antibacterial or through protection of the bacteria from attack."

(iii) "Also, the use of products containing low levels of sulfa drugs is to be discouraged since, apart from being ineffective, they may encourage the development of sulfa-drug-resistant strains of bacteria. Furthermore, the results of this study suggest that many of the materials commonly employed in other areas of fish culture may be inadequate and need to be re-evaluated."

(iv) "The selection of suitable antiseptic agents for various purposes, coupled with the use of sterile foods, would contribute substantially to the control of fish diseases."

These conclusions, reached as a result of controlled tests on the products, emphasize the general inadequacy of current methods of fish disease control as generally applied in the ornamental fish trade. Shippers, dealers and hobbyists are clearly quite unaware of the rationale underlying disease control in ornamental fish and an attempt to underline the basic principles upon which the use of medication in such fish depends, has been given by Conroy (1974) in the following terms:

"In aquarium medicine, many concepts have to be taken into account with regard to the use of a specific remedy, and among these the following ones are fundamental:

(i) the price should be such as to enable the product to be acquired by the consumer;

(ii) the product must be free of toxic effects on the fish at the recommended dosage for use;

(iii) the product must be effective against a wide range of micro-organisms or parasites;

(iv) the product must have a similar effect in different types of water, without giving rise to any changes in the biological equilibrium of the aquarium;

(v) the product must be easy to use in practice;

(vi) the product must reach and maintain adequate preventive or therapeutic levels for the period during which it is applied;

(vii) in the case of internal or systemic infections, the product has to be rapidly absorbed and eliminated by the fish;

(viii) the product must not give rise to strains of bacteria or other organisms which are resistant to the active ingredient following its application in the aquarium."

It is clear from the preceding remarks, and from the conclusions reached by Trust (op. cit.) that many of the preparations currently used for the control of ornamental fish diseases are either unsuitable or ineffective; the same considerations also apply to sulphonamides and antibiotics used as "tonics" or general "panaceas". It is known, for example, that chlortetracycline loses much of its efficacy in waters with a high pH, thereby making it unsuitable for use with many species of ornamental fish. A further problem is the fact that many of the aquatic bacteria responsible for epizootics among ornamental fish quickly develop a resistance to antibiotics such as tetracyclines, and to sulphonamides.

Recent developments in the field of fish disease control have led to the formulation of compounds designed specifically to be used with fish, and one such compound is nifurpirinol. This compound, a nitrofuran derivative, is intended exclusively for the control (prevention and treatment) of many bacterial, mycotic and protozoal diseases of fish; as such, it has no application in the field of human or veterinary medicine. Investigations into the properties and applications of nifurpirinol in the

practical control of the diseases of freshwater and saltwater ornamental fish have been carried out in a number of countries and the results have proved extremely encouraging. In Colombia, for example, the use of nifurpirinol as a routine procedure was recommended by the Fish Pathology Service of INDERENA (Ministry of Agriculture) to ornamental fish exporters; this practice has reduced mortalities in the holding facilities from 60% to 20% and resulted in a saving calculated at approximately U.S.$ 250 000 per year to the industry. Trial shipments of ornamental fish from Colombia to the U.S.A. have been made using a prophylactic level of nifurpirinol and the exporters who collaborated in this study have received complimentary messages and congratulations from their clients as to the lack of mortalities and on the disease-free status of the shipments. This case is cited as being illustrative of how practical problems can be resolved by the application of recent developments in the field of fish pathology.

In order that the several problems associated with ornamental fish diseases and their control can be resolved, there is an urgent need for more biologists in the developing countries to be trained in all aspects of the diagnosis and prevention of such diseases. It is recommended, therefore, that universities and official institutions in the developing countries be urged to consider how best their biologists might be given opportunities to receive training in fish pathology. One possibility is that short theoretical/practical training courses be given at regional centres, and it is important that the teaching personnel concerned shall themselves have experience in the subject in the local environment. Experience in Colombia (Conroy, 1975) has shown that such courses are practicable and that they provide the participants with useful practical knowledge of the problem and means to control such diseases.

The adoption of effective measures to combat and control ornamental fish diseases at source would require that all shipments are subjected to inspection and certification by biologists in the country or countries of origin of the fish. In this context, a practical suggestion would be that all fish intended for export are held in special quarantine facilities at the exporters' establishments for a period of not less than 5 days, so that the corresponding visual (clinical) inspection, laboratory examination and (as appropriate) treatment schedule can be applied by the biologists responsible for the implementation of all fish disease certification and control measures applicable to live ornamental fish. In strictly practical terms, the recognition of a number of the more common diseases and/or parasitic infestations is unlikely to present any difficulties to the trained biologist, particularly in cases where the clinical observations can be accompanied and complemented by the microscopical examination of smears and scrapings, either from obviously diseased fish or at random from "apparently healthy" specimens.

Methods of shipment could be considerably improved by the use of suitable tranquillizing substances. The advantages of tranquillization are many and include a reduction in the consumption of oxygen used in respiration and a reduction in the excretion of catabolic by-products by the fish. Through the use of tranquillizers, shippers are able to double or treble the numbers of fish in a given space and are finding that the fish arrive at their destination with fewer wounds and lesions (so that the incidence of bacterial or mycotic superinfection is reduced). It has already been mentioned (section 5.2 above) that many shippers are now tending to use tranquillizers, and quinaldine (2-methoxyquinoline) is particularly popular with shippers of saltwater ornamental fish. The characteristics and properties of anaesthetics used for fish transportation have been summarized by Bell (1964). For a tranquillizer to have a practical application to the shipment of live ornamental fish, it is desirable that the following general requirements are met:

(i) the compound must be extremely soluble both in fresh water and in salt water;

(ii) the compound must be effective for a wide range of fish species at low concentrations;

(iii) the compound must possess a wide safety margin and be free from toxic effects;

(iv) recovery of the tranquillized fish must be rapid and complete following use of the compound.

New compounds suitable for the tranquillization and anaesthesia of fish are being developed, particularly with reference to their use in the shipment of food fish and their fry for the stocking of fish farms and aquaculture establishments. One substance which appears very promising in this regard has the chemical structure 1-1-(1-phenyl-ethyl) 5-(propoxyl-carbonyl)-imidazole hydrochloride, and is known as propoxate. In an aqueous stock solution, propoxate loses no more than 1% of its

activity when stored for one month at room temperature, and less than 0.1% of its activity when stored for one month in a refrigerator at 0-4°C. An effective concentration of 0.25-0.5 ppm is suitable for inducing Stage II anaesthesia (i.e., "tranquillization" for shipment) and rapid recovery is achieved when the fish are placed in "clean" water. It is obvious that the use of tranquillizers by ornamental fish shippers will need to be controlled and it is suggested that all such shipments should bear a notice on the package giving the name and effective concentration of the tranquillizer used. Such a system would enable the importers to take the appropriate steps to ensure full recovery from the drug.

A subject over which considerable concern has been expressed is the ultimate fate of the water in which shipments of live ornamental fish are made. This concern is not only relevant to the possible introduction of "new" diseases of fish and aquatic plants, but also includes the potential danger of introducing human disease organisms and/or their vectors through the use of water which may be contaminated in the country of origin. A number of measures have been proposed to control the possible introduction of harmful bacteria, snails, etc., through the release of untreated effluent water from ornamental fish farms and importers' warehouses. Axelrod (1973) reports that shipments of ornamental fish which have been raised in Florida are usually shipped in water taken from deep wells and whose bacteriological quality (in terms of freedom from human pathogens) is constantly monitored. With reference to the treatment of water in which fish are shipped from other countries to the U.S.A., Axelrod (op. cit.) suggests that "the addition of two drops of a 5% aqueous solution of malachite green or methylene blue (certain species such as the naked catfishes and loaches may be unable to tolerate malachite green) to each 4 litres of water plus the addition of 500 mg of tetracycline to this same 4 litres, would not only be beneficial to the fishes, but would help to control the typhoid bacillus and Schistosoma fluke which might be present in the water". In view of the findings of Trust (1972), reported above, it is questionable whether this practice would achieve the desired objective of controlling fish and human pathogens in the water used for the shipment of ornamental fish.

A number of proposals have been made as to how the water used in the shipment of live ornamental fish could be disposed of in order to control the introduction of pathogenic organisms. Courtenay and Robins (1973) have suggested, for example, that the average quantity of water involved in the case of freshwater fish imports into Florida in any one year is not likely to be less than 3 million gallons (approximately 13.5 million litres). Several individual workers and organizations have expressed reservations with regard to current practices through which organisms, pathogenic to freshwater and saltwater fish, might be released into the ecosystem via the discharge of untreated effluents from fish farms, aquaria, etc. The reality of the situation may be judged from statements and recommendations such as the following:

(a) "Diseases and parasites of fishes are still very poorly understood even in countries like the United States with its high level of fisheries knowledge. Much less is known of the diseases of fishes from South America; yet it is from precisely such areas that Florida draws its huge imports." (Courtenay and Robins, 1973).

(b) "Every effort should be made to study disease inter-relationships and to take steps for assuring effective quarantine resulting in disease-free game." (Lachner et al., 1970)

A sensible approach to the problem would be for the effluent water to be discharged directly into concrete tanks or other suitable facilities in which it can be treated with approved chemical disinfectants prior to release. In cases of shipments of saltwater species, for example, it has been recommended (ICES, 1972) that the organisms be held in quarantine to establish their disease-free status, and that sea water which has been in contact with the stock be disinfected by overnight exposure to 10 ppm of active chlorine prior to discharge as an effluent. Recent research (Amend and Pietsch, 1972; McFadden, 1969; Ross and Smith, 1972) has demonstrated conclusively that many of the more important viral, bacterial and fungal pathogens of fish can be successfully controlled by the use of an aqueous solution of povidone-iodine (PVP-I, polyvinylpryrrolidone-iodine), an organic iodine compound whose use in the control of specified infectious diseases of salmonids is being recommended officially in connexion with the EIFAC/FAO International Convention for the Control of the Communicable Diseases of Fish (FAO, 1974). In connexion with the treatment of aquarium fish effluent water, it is recommended that this be treated by exposure to a concentration of PVP-I corresponding to a level of not less that 100 ppm of available iodine, and at a pH of approximately 7.0; the requirement for a pH of 7.0 can be satisfied by the application of buffered solutions of PVP-I. A period of exposure to the disinfectant of not less than 30 minutes is recommended initially.

This organic iodine preparation has the advantage of being simple to use in practice and loses its amber colour as the iodine is eliminated - a fact which would indicate to the shipper or importer that the solution has lost its disinfecting properties. The application of this technique in practice is being undertaken in Colombian shippers' facilities for effluent water with great success; as was mentioned above, most of the more reputable shippers now use city drinking water for shipments destined abroad.

One of the practical problems affecting the trade is the existence of "pirate" organizations or companies which, following a period of activity, may become insolvent. The simplest remedy for this distasteful situation is that all dealers in ornamental fish, whether exporters or importers, should be registered officially by the authorities of the country concerned and, possibly, by the appropriate trade organization if such exists. In this way, there would be an opportunity for the aggrieved party to have recourse to an official entity in the case of non-compliance with the commercial aspects of an order and its payment.

The preparation of a comprehensive and authoritative analysis of the ornamental fish trade can only be achieved through the fullest cooperation between the authorities of the countries concerned and between representatives of the trade (including all levels of activity from collectors to shippers, to dealers and retailers). Among the important problems to be discussed is the need for a scientific evaluation of natural stocks of "ornamental" species and for decisions to be reached as to which species should be considered "endangered" and/or "protected" in the country of origin, just as much as "undesirable" or "noxious" in the country of receipt. In such a manner it would be feasible for the exporting countries to draw up lists of those species whose shipment as ornamental fish is controlled or prohibited, whilst conversely the importing countries could advise the exporters as to those species whose importation may be prohibited for other reasons (e.g., piranas, cetopsid and trichomycterid catfishes). The U.S. authorities have recently produced a "clean" list of freshwater ornamental fish whose importation into that country is permitted (Appendix VI).

Other matters suitable for discussion at such a meeting or conference include agreement on fish disease control measures, the mutal acceptance of certification (e.g., inspection at source, disease-free status, etc.), shipments from licensed exporters to licensed importers only. In spite of the doubtless very best intentions expressed by members of the ornamental fish trade, it is unfair to expect that the industry shall have to "police itself" without help and guidance from biologists competent to diagnose and recommend control measures for ornamental fish diseases; it is suggested that such help and guidance might best be made available through the offices of the Government concerned.

Few figures are available on the actual value of ornamental fish exports in terms of the total fishery exports, but it is of interest to note that in Indonesia these figures increased from 0.3% in 1966 to 1.2% in 1968. It is clear that a trade valued at more than U.S.$ 4 000 million per year is one which requires urgent investigation and evaluation, particularly as there is a tendency for the demand for ornamental fish to increase year by year; through adequate exploitation of their natural resources, many of the developing nations could find this trade of great benefit as a source of foreign exchange and work for their nationals.

7. RECOMMENDATIONS

The ornamental fish trade, by which is meant the capture or production of live fish and their shipment and sale for maintenance in aquaria, fish tanks, pools and garden ponds, is a significant commercial activity currently evaluated at approximately U.S.$ 4 000 million per year. The increasing demand for ornamental fish is of particular importance and relevance to the developing nations, many of which possess freshwater and/or saltwater species likely to be of interest to this trade. In order that the current situation and future potential for the trade can be appraised and evaluated, it is recommended that the following proposals be acted upon:

(i) In view of the significance of the ornamental fish trade measured in U.S.$ and the need to quantify movement of ornamental fish throughout the world, it is essential that FAO collects data on quantities and value of exports by country of origin and destination. This could be published as a tabulation under sub-group 034.1 of the SITC Rev. 2 as an item covering ornamental fish (all live fish destined for keeping in public and private aquaria, fish tanks, ornamental pools, etc.) possibly further broken down into marine and freshwater species.

(ii) The increasing recognition and importance being given to the breeding and propagation of ornamental fish in several countries, particularly in Asia, suggests that this specialized type of aquaculture is making a significant contribution in terms of the numbers of species and varieties of fish being supplied to the trade. It is, therefore, recommended that the countries in which such aquacultural practices are being developed on a commercial basis might be asked to provide, on a purely voluntary basis, information on the number of fish farmers engaged in this activity and the principal species of fish involved.

(iii) As a result of the concern which is being expressed with reference to the possible over-exploitation of wild stocks to supply the constant demands of the ornamental fish trade, it is recommended that a cooperative research programme be initiated to study the pertinent facts relating to the current status and potential for exploitation of the more popular aquarium species of fish. The initiation of such a cooperative research programme is of particular importance in the Amazon, Orinoco and River Plate-Paraná areas of South America, where collectors are experiencing difficulties due to what appears to be stock depletion. It is strongly recommended that consideration be given to the inclusion of studies on ornamental fish or of species capable of being developed as ornamental fish, in Fisheries Projects undertaken under international, bilateral or national financing in developing countries.

(iv) There is an obvious need for a licensing or permit system to be introduced at the earliest opportunity in the countries from which live ornamental fish are exported and in countries which import live ornamental fish. The aim of such a system should be to ensure full compliance with all regulations, laws and other formalities, by individuals or companies involved or concerned in the collection, handling and shipping of such fish. In this way, it would be possible for the authorities to exercise a better degree of control and similarly to provide more accurate information on the trade (as recommended in paragraph (i) above).

(v) With reference to fish disease control, it is strongly recommended that a system of International Fish Health Certificates be introduced for ornamental species, much along the lines of the certificates proposed by the EIFAC/FAO International Convention for the Control of the Communicable Diseases of Fish. Further recommendations for the implementation of this proposal are as follows:

(a) draft Fish Health Certificates should be prepared by FAO to cover a limited number of recognizable infectious diseases and parasitic infestations commonly occurring in ornamental fish;

(b) separate Fish Health Certificates be prepared for freshwater and saltwater ornamental fish respectively; specimen draft certificates are given in Appendix VIII of this report;

(c) the preparation of an informative chart, folder of booklet giving the main characteristics upon which the diseases covered by the certificates can be recognized and diagnosed. It is essential that the text be couched in simple language so that the documents can be used by shippers and dealers, and it is recommended that the preparation of these documents be entrusted to FAO.

8. REFERENCES

Amend, D.F. and J.P. Pietsch, 1972 Virucidal activity of two iodophors to salmonid viruses. J.Fish.Res. Board Can., 29:61-5

Axelrod, H.R., 1971 The aquarium fish industry - 1971. Jersey City, New Jersey, TFH Publications, 7 p.

_____, 1973 Controlling major communicable fish diseases by improving methods for storing, transporting and receiving shipments of tropical fishes in all parts of the world. EIFAC Tech.Pap., (17):242-7

_____, 1973a Report of Exotic Fishes Committee, American Fisheries Society. Trans.Am.Fish.Soc., 102:239-50

Axelrod, H.R. et al., Raising tropical fishes commercially. In Exotic tropical fishes. Jersey City, 1969 New Jersey, TFH Publications, C.1.00-C.48.00

Bell, G.R., A guide to the properties, characteristics and uses of some general anaesthetics for fish. 1964 Bull.Fish.Res.Board Can., (148):

Bermúdez A., D., Aplicación del nifurpirinol (Furanace) en el control de enfermedades contagiosas e 1974 infecciosas en algunas especies ícticas ornamentales de Colombia. Thesis, Facultad de Ciencias del Mar, University of Bogota

British Guiana, Fisheries Division of the Department of Agriculture, Report. Review of the fisheries 1958 of British Guiana. Bull.Fish.Div.Dep.Agric.Brit.Guiana, (1)

California, Resource Agency of California, Regulations governing domesticated fish breeder's license. 1971 Inland Fish.Inf.Leafl.Resour.Ag.Calif.Dep.Fish Game, (8)

Conroy, D.A., Las enfermedades de los peces y su curación. Barcelona, Ediciones Vida Acuática, 1974 Colección Vida Acuática No.4: 144 p.

_____, Informe sobre las enfermedades de la trucha arco iris (Salmo gairdnerii) en Colombia. 1975 Publ.Proy.Desarr.Pesca Cont.INDERENA/FAO, (1)

Cortéz, A., Esquema de política sobre administración de peces ornamentales. Caracas, Ministerio de 1974 Agricultura y Cría, Oficina Nacional de Pesca, 18 p. (mimeo)

Courtenay, W.R. and C.R. Robins, Exotic aquatic organisms in Florida with emphasis on fishes. A 1973 review and recommendations. Trans.Am.Fish.Soc., 102:1-12

FAO, Government Consultation on an International Convention for the Control of the Spread of Major 1974 Communicable Fish Diseases, Aviemore, Scotland, 30 April-1 May 1974. FAO Fish.Rep., (149):17 p.

ICES, Report of the working group on introduction of non-indigenous marine organisms. Coop.Res.Rep. 1972 ICES, (32):22-5;29;33-5;39-41

IDRC, Aquaculture in Southeast Asia: Report on a Seminar at the Freshwater Fishery Research Station, 1973 West Malaysia, 17-25 April 1973. Ottawa, International Development Research Centre, IRDC-015e:10-1

Indonesia, Directorate General of Fisheries, Fisheries Statistics of Indonesia, 1972. Jakarta, 1973 Department of Agriculture

Lachner, E.A., C.R. Robins and W.R. Courtenay, Exotic fishes and other organisms introduced into 1970 North America. Smithsonian Contrib.Zool., (59):29 p.

McFadden, T.W., Effective disinfection of trout eggs to prevent egg transmission of Aeromonas 1969 liquefaciens. J.Fish.Res.Board Can., 26:2311-8

Mago L., F., La ictiofauna del Casiquiare. Rev.Defensa Nat.Caracas, 1:5-6;8-11 1971

_____, Estudio de los peces ornamentales de acuario de la Amazonia venezolana. Simposio 1973 Internacional sobre Fauna Silvestre y Pesca Fluvial y Lacustre Amazónica, Manaus, 23 p. (mimeo)

Meyer, F.P., K.E. Sneed and P.T. Eschmeyer, Second report to the fish farmers. The status of warm- 1973 water fish farming and progress in fish farming research. Resour.Publ.Bur.Sport Fish. Wildl., (113):2;87-92

Miller, R.R., Pisces: fresh water fishes. IUCN Red Data Book, (4) 1971

Setzer, P.A., Second Annual State of the Pet Industry Report. Pets/Supplies/Marketing, May 1974:42-50 1974

Thompson, P.E., W.A. Dill and G. Moore, The major communicable fish diseases of Europe and North America. A review of national and international measures for their control. EIFAC Tech.Pap., (17) Suppl.1:48 p.
1973

Trust, T.J., Inadequacy of aquarium antibacterial formulations for the inhibition of potential pathogens of freshwater fish. J.Fish.Res.Board Can., 29:1425-30
1972

Zenny, F.B., Comparative study of laws and regulations governing the international traffic in live fish and fish eggs. EIFAC Tech.Pap., (10):52 p.
1969

Anon., ¿Qué es CERPER? Documenta, Lima, (22):7-9
1972

_____, Fish Health News, 2(1)
1973

APPENDIX I

Table 1

AUSTRALIA - Imports of fish not for human consumption (includes live fish whether or not fit for human consumption)

Year	Quantity	Value[a] (A.$)
1963-64	277 863	21 000
1964-65	936 000	62 000
1965-66	1 055 000	73 000
1966-67	1 429 000	103 000
1967-68	1 970 000	133 000
1968-69	2 524 000	184 000

a/ F.O.B. value
U.S.$ 1.00 = A.$ 0.738 (May 1975)

Source of data: "Statistical Bulletin, Fisheries", No. 15 (1968-69)
"Statistical Bulletin, Fisheries", No. 14 (1967-68)
"Statistical Bulletin, Fisheries", No. 13 (1966-67)
"Statistical Bulletin, Fisheries", No. 12 (1965-66)
Published by the Commonwealth Bureau of Census and Statistics, Canberra, Australia

Table 2

COLOMBIA - Export of ornamental fish (1969-70)

Month	1969		1970	
	Number of fish	Value (U.S.$)	Number of fish	Value (U.S.$)
January	90 440	7 110	374 276	28 113
February	277 305	37 040	265 035	17 339
March	521 304	64 949	256 515	18 901
April	305 927	21 967	311 310	20 896
May	318 689	34 698	280 640	12 719
June	233 705	14 901	222 720	10 263
July	219 455	14 226	289 070	16 341
August	284 018	21 254	350 637	15 040
September	285 009	22 393	270 895	12 188
October	37 550	2 206	350 155	18 852
November	138 400	11 550	230 894	13 860
December	266 198	19 834	171 515	9 354
Total	2 978 000	272 136	3 373 662	193 866

Source of data: Bermúdez, A., D. (Thesis, 1974)

Table 3

COLOMBIA - Export of ornamental fish (1970)

Species	Number	Value (U.S.$)	Destination
Barbus spp.	4 000	230.00	Fed. Rep. of Germany, Mexico, U.K., U.S.A.
Cardinal tetras	431 940	17 521.40	Fed. Rep. of Germany, U.K., U.S.A.
Bunocephalus sp.	41 540	3 559.00	Fed. Rep. of Germany, Mexico, U.S.A.
Corydoras spp.	568 391	36 009.56	Fed. Rep. of Germany, Spain, U.K., U.S.A.
Cichlids	213 000	21 742.00	Fed. Rep. of Germany, Mexico, U.S.A.
Loricaria spp.	49 110	4 171.00	Fed. Rep. of Germany, Spain, U.S.A.
Neon tetras	460 109	14 493.00	Fed. Rep. of Germany, Mexico, Spain, U.S.A.
Plecostomus spp.	523 225	46 997.00	Belgium, Fed. Rep. of Germany, Mexico, Sweden, U.S.A.
Pencil fish	46 080	1 815.00	Mexico, U.S.A
Apistogramma ramirezi	177 475	21 329.00	Mexico, U.K., U.S.A.
Various species	858 792	26 000.00	Several countries
Total	3 373 662	193 866.96	

Source of data: Bermúdez, A., D. (Thesis, 1974)

Table 4

COLOMBIA - Export of live ornamental fish to the U.S.A. (July-December 1973)

Fish species		Number	Value (U.S.$)
Apistogrammas	(Apistogramma spp.)	4 000	80.00
Ararí	(Chalceus macrolepidotus)	500	270.00
Angelicus	(Pimelodus angelicus)	22 000	7 160.00
Abramites	(Abramites spp.)	15 645	2 410.60
Arawana	(Osteoglossum bicirrhosum)	60 060	28 186.00
Agujón	(Ctenolucius hujeta)	35	52.50
Bagre morichalero		45	135.00
Blood fin	(Aphyocharax rubripinnis)	15 000	800.00
Brillantes	(Hemigrammus armstrongi)	88 651	7 819.91
Black knife	(Gymnotus sp.)	1 000	100.00
Bettas	(Betta spp.)	17 000	960.00
Bumblebee cats	(Microglanis sp.)	16 000	1 600.00
Cajaro	(Paractocephalus hemiliopterus)	1	14.92
Coli roja	(Aphyocharax rubripinnis)	5 501	389.00
Cardenales	(Cheirodon axelrodi)	256 600	9 164.00
Corydoras	(Corydoras spp.)	598 414	45 046.80
	Cichla ocellaris	300	120.00
Catalinas	(Bunocephalus spp.)	7 000	1 400.00
Cuchillas	(Eigenmannia sp., Gymnotus carapo)	5 500	465.00
Cichlids		10 020	1 020.00
Chilodus	(Chilodus punctatus)	73 400	9 561.00
Chalceus	(Chalceus sp.)	20 000	1 000.00
Copeinas	(Copeina spp.)	2 000	100.00
Doras	(Amblydoras spp., Doras spp., Acanthodoras spp.)	3 080	300.90
Dormitator	(Dormitator sp.)	50	75.00
Discos	(Symphysodon discus)	7 830	15 255.00
Escalares	(Pterophyllum altum, P. scalare)	11 371	2 625.66
Estrigatas	(Carnegiella strigatus)	66 250	5 146.15
Emperadores	(Nematobrycon palmeri)	65 950	17 925.00
Farlowelas	(Farlowella sp.)	6 651	414.80
Festivum	(Cichlasoma festivum)	400	40.00
Fasciatus	(Leporinus fasciatus)	99	99.00
Ghost knife	(Sternarchus albifrons)	6 000	1 200.00
Gancho rojo	(Myloplus spp.)	170	150.00
Gold tetra	(Hemigrammus armstrongi)	156 712	6 392.58
Gibosos	(Charax gibbosus)	35	2.80
Gobbis	(Gobius sp.)	600	120.00
Goldfish	(Carassius auratus)	2 000	200.00
Hemiodus	(Hemiodopsis spp.)	23 430	8 869.50
Hatchet (marbled)	(Carnegiella sp.)	3 925	194.25
Hilo negro	(Ephiphicharax sp.)	5 000	250.00
Juan viejo	(Geophagus spp.)	1 900	214.00
Jurupari	(G. jurupari)	16 150	10 980.00
Loricaria	(Loricaria spp.)	117 430	7 470.00
Lapiz	(Nannostomus spp.)	43 620	3 518.20
Leporinos	(Leporinus spp.)	1 610	1 184.00
Lisas	(Anostomus taeniata)	1 000	200.00
Loreto tetras	(Hyphessobrycon peruvianus)	29 100	1 234.00
Mojarras	(Aequidens spp.)	21 607	3 731.32
Metynes	(Metynnis spp.)	6 261	7 185.80
Monedas	(Metynnis spp.)	85 432	9 352.70
Marginatus	(Nannostomus marginatus)	1 000	120.00
Milosoma especial	(Mylossoma sp.)	24 009	9 003.50

Table 4 (continued)

Fish species		Number	Value (U.S.$)
Neones	(Hyphessobrycon innesi)	408 099	17 797.17
Otocinclos	(Otocinclus spp.)	34 825	2 026.70
Oscares	(Astronotus ocellatus)	1	2.00
Piñas	(Hemiancistrus sp.)	2 000	200.00
Palomitas	(Carnegiella spp.)	410	55.80
Pez hoja	(Monocirrhus polyacanthus)	20	8.20
Paletones	(Sorubim lima)	1 741	1 115.00
Playeros		500	40.00
Plecostomus	(Plecostomus spp.)	837 135	78 546.52
Pimelodelas	(Pimelodella spp.)	50 019	8 605.45
Pacamú	(Microglanis sp.)	39 068	7 404.48
Pico rojo	(Myloplus sp.)	16 210	3 506.20
Pike cichlid	(Crenicichla spp.)	202	81.18
Farlowelas	(Farlowella spp.)	21 700	1 236.00
Punctatus	(Chilodus punctatus)	5 000	300.00
Rodostomos	(Hemigrammus rhodostomus)	44 500	2 350.00
Rojitos	(Megalamphodus sweglesi)	74 131	7 778.13
Ramirezi	(Apistogramma ramirezi)	183 550	15 554.50
Red phantom tetra	(Megalamphodus sweglesi)	117 000	5 680.00
Rubi tetra	(Axelrodia riesei)	53 500	1 145.00
Ruminose	(Hemigrammus rhodostomus)	31 500	2 445.00
Red hook	(Myloplus sp.)	3 495	6 142.50
Red-tail cat	(Phractocephalus hemiliopterus)	100	1 500.00
Rositas	(Ephiphicharax sp.)	1 000	50.00
Sapuara	(Prochilodus sp.)	7 056	5 370.00
Shovel nose	(Sorubim lima)	1 000	700.00
Tijeros	(Hemiodopsis spp.)	13 000	1 275.00
Tetras	(various species)	99 310	4 270.00
Tigritos	(Pimelodus pictus)	16 088	3 941.90
Transparentes	(Gymnotus sp.)	4 000	400.00
Various		85 527	13 133.00
Total		5 083 196	483 157.94

Note: It will be noted that several designations are used for the same species on Customs Declaration Forms

Source of data: Bermúdez, A., D. (Thesis, 1974)

Table 5

COLOMBIA - Export of live ornamental fish to the U.S.A. (3-26 September 1973)

Fish species		Number	Value (U.S.$)
Abramites	(Abramites spp.)	6 950	899.00
Agujón	(Ctenolucius hujeta)	5	7.50
Arawanas	(Osteoglossum bicirrhosum)	1 000	700.00
Brillantes	(Hemigrammus armstrongi)	15 000	900.00
Bumblebee cats	(Microglanis sp.)	1 000	100.00
Coridoras	(Corydoras spp.)	42 900	2 230.00
Cardenales	(Cheirodon axelrodi)	64 950	3 170.00
Copeinas	(Copeina spp.)	2 000	100.00
Cuchillos	(Eigenmannia sp., Gymnotus carapo)	100	15.00
	Cichla ocellaris	300	120.00
Chilodos	(Chilodus punctatus)	16 650	2 309.50
Doras	(Amblydoras spp., Acanthodoras spp., Doras spp.)	900	90.00
Discos	(Symphysodon discus)	2 800	5 080.00
Dormitator	(Dormitator spp.)	50	75.00
Erviudus	(Hemiodopsis spp.)	5 500	1 100.00
Escalares	(Pterophyllum altum, P. scalare)	3 900	780.00
Emperadores	(Nematobrycon palmeri)	13 600	4 560.00
Estrigatas	(Carnegiella strigatus)	15 000	740.00
Farlowelas	(Farlowella spp.)	600	36.00
Gold tetra	(Hemigrammus armstrongi)	44 510	2 541.00
Gobbis	(Gobius sp.)	600	36.00
Ghost knife	(Sternarchus albifrons)	600	120.00
Hemiodus	(Hemiodopsis spp.)	200	100.00
Juan viejo	(Geophagus spp.)	100	20.00
Jurupari	(G. jurupari)	300	300.00
Loricarias	(Loricaria spp.)	26 200	2 168.00
Lisas	(Anostomus taeniata)	1 000	200.00
Leporinos	(Leporinus spp.)	400	400.00
Metynes	(Metynnis spp.)	13 700	1 366.00
Monedas	(Metynnis spp.)	20 000	2 000.00
Milosoma	(Mylossoma spp.)	3 050	1 220.00
Neones	(Hyphessobrycon innesi)	40 800	1 560.00
Otocinclos	(Otocinclus spp.)	4 510	295.70
Oscares	(Astronotus ocellatus)	1	2.00
Paletones	(Sorubim lima)	200	80.00
	Pimelodus angelicus	5 000	2 000.00
Pimelodelas	(Pimelodella spp.)	6 400	992.00
Pacamú	(Microglanis sp.)	12 000	820.00
Pampano		1 300	1 300.00
Pencil fish	(Nannostomus spp., Poecilobrycon	1 970	118.20
Pike cichlids	(Cranicichla spp.)	20	80.00
Plecostomus	(Plecostomus spp.)	68 500	5 755.00
Prochilodus	(Prochilodus spp.)	600	600.00
Ramirezis	(Apistogramma ramirezi)	26 200	2 397.00
Ruminose	(Hemigrammus rhodostomus)	2 500	250.00
Rubi tetra	(Axelrodia riesei)	10 000	200.00
Rodostomos	(Hemigrammus rhodostomus)	13 000	1 300.00
Red pacú	(Myloplus asterias)	170	312.00
Red phantom tetra	(Megalamphodus sweglesi)	15 000	700.00
Rojitos	(M. sweglesi)	6 000	600.00
Shovel nose	(Sorubim lima)	1 100	770.00
Sapuaras	(Prochilodus sp.)	38	38.00
Transparent knife	(Gymnotus sp.)	2 000	200.00
Various		1 000	60.00
Total		522 174	53 996.90

Source of data: Bermúdez, A., D. (Thesis, 1974)

Table 6

EUROPE - Imports and exports of aquarium fishes

Country	Year	Imports	Exports	Value
Belgium	January-August 1971	33 900 kg		B.F.[a] 16 908 000
Belgium	January-August 1971		5 000 kg	B.F. 3 078 000
Cyprus	1971	10 000 fish		?
Fed. Rep. of Germany	1970	56 010 kg		D.M.[b] 7 390 000
Fed. Rep. of Germany	1970		10 415 kg	D.M. 1 067 000
U.K.	1970	900 000 fish		?

a/ U.S.$ 1.00 = B.F. 35.00 (May 1975)

b/ U.S.$ 1.00 = D.M. 2.45 (May 1975)

Source of data: FI/EIFAC/68/SC-II - 17 (1968); EIFAC/T17 (suppl. 1)

Table 7

GUYANA - Exports of aquarium fishes (1957)

Country of destination	Number of fish	Value (U.S.$)	Percent
1. AMERICA			
Barbados	150	20	
Canada	1 300	260	0.16
U.S.A.	721 940	141 260	89.46
2. EUROPE			
Belgium	3 600	720	0.46
The Netherlands	5 500	1 100	0.69
Total	808 090	157 900	

Source of data: "Review of the Fisheries of British Guiana", Fisheries Division of the Agriculture Department, Bulletin No. 1 (1958)

Table 8

GUYANA - Exports of aquarium fishes (1958)

Country of destination	Number of fish	Value (U.S.$)	Percent
1. AMERICA			
Canada	1 600	160	0.10
Jamaica	12	1	
Puerto Rico	1 500	300	0.12
Trinidad	10 300	1 340	0.80
U.S.A.	860 012	163 250	97.41
2. EUROPE			
Belgium	4 000	800	0.48
Fed. Rep. of Germany	1 500	300	0.12
The Netherlands	7 200	1 400	0.86

Source of data: "Review of the Fisheries of British Guiana", Fisheries Division of the Agriculture Department, Bulletin No. 1 (1958)

Table 9

HONG KONG - Exports of aquarium fishes (1969-73)[a/] (in HK.$)[b/]

Country	1969	1970	1971	1972	1973
1. AFRICA					
Israel	6 702	9 561	5 233	1 716	7 871
Kenya	-	717	3 468	1 400	-
Lebanon	-	-	-	4 676	-
Malawi	-	-	834	-	-
Mauritius	2 403	2 911	1 239	519	-
South Africa	91 165	96 415	157 042	73 843	149 780
Syria	840	-	-	-	-
Zambia	972	1 966	8 282	4 600	6 613
2. AMERICA					
Canada	242 958	393 601	795 608	909 127	145 022
Mexico	-	10 166	9 778	-	9 817
Netherlands Antilles	-	-	-	-	6 327
U.S.A.	4 256 051	5 633 032	6 805 618	7 530 120	10 928 072
Venezuela	-	-	-	1 029	3 414
3. ASIA					
Brunei	-	1 339	-	-	-
Indonesia	-	-	850	-	-
Japan	6 152 732	5 238 805	3 805 085	2 968 357	2 447 468
Malaysia	55 044	34 979	21 245	14 573	19 632

a/ These export figures refer to freshwater fish only

b/ U.S.$ 1.00 = HK.$ 4.87 (May 1975)

Table 9 (continued)

Country	1969	1970	1971	1972	1973
3. ASIA (continued)					
Pakistan	544	-	-	-	-
Sabah	-	2 000	6 920	-	8 048
Sarawak	-	4 960	6 720	820	1 270
Singapore	1 112 798	1 282 199	1 419 453	1 707 415	2 191 324
Taiwan	2 000	36 859	10 154	6 310	224 638
Thailand	-	3 606	18 009	1 770	37 121
4. AUSTRALASIA					
Australia	139 946	154 914	223 968	187 940	159 953
New Zealand	1 260	1 705	30 929	29 476	47 896
U.S. Oceania	9 844	8 471	29 921	17 329	4 895
5. EUROPE					
Austria	51 073	111 785	68 674	41 328	94 304
Belgium	66 982	130 153	202 313	179 279	177 063
Cyprus	2 426	1 683	1 289	-	872
Denmark	68 626	52 425	38 460	34 229	105 645
Finland	-	1 341	1 021	2 382	2 185
France	16 541	22 365	61 916	77 136	80 822
Fed. Rep. of Germany	341 244	519 118	670 115	851 428	936 391
Italy	9 003	19 364	39 961	47 090	52 693
Greece	-	-	1 704	842	842
Malta	-	-	-	-	893
The Netherlands	200 445	280 159	490 058	618 832	853 273
Portugal	1 220	11 478	4 882	12 284	3 864
Spain	4 602	1 442	2 452	-	5 744
Sweden	7 658	13 059	26 260	19 057	110 141
Switzerland	14 431	18 810	33 934	26 688	36 468
U.K.	398 988	619 893	679 325	656 337	517 543
Total	13 258 498	14 721 281	15 682 720	16 027 932	20 377 904

Source of data: Personal communication from Hong Kong Agriculture and Fisheries Department (1975)

Table 10

HONG KONG - Imports of aquarium fishes (1969-73)
(in HK.$)

Country	1969	1970	1971	1972	1973
1. AMERICA					
Brasil	-	-	1 964	-	-
Canada	-	1 060	-	-	-
U.S.A.	5 139	8 479	-	2 245	9 177
2. ASIA					
China	32 810	81 560	115 230	32 505	130 024
India	-	590	-	-	-
Indonesia a/	277 855	168 198	188 955	182 240	240 897
Japan	1 382	4 596	3 154	2 112	9 967
Khmer Republic	-	-	16 763	-	-
Malaysia	-	2 731	2 694	33 363	20 202
Philippines b/	-	-	4 067	13 171	62 674
Singapore a/	158 175	304 957	275 764	444 884	630 044
Sri Lanka a/	5 457	1 086	16 341	29 841	35 215
Taiwan a/	60 019	116 009	175 017	141 646	122 887
Thailand	567 977	625 774	709 993	627 467	922 864
3. EUROPE					
Belgium	-	1 095	-	-	-
Fed. Rep. of Germany	-	1 535	5 300	-	-
Total	1 108 814	1 317 670	1 515 242	1 509 474	2 183 951

a/ Imports from Taiwan, Singapore, Indonesia, and Sri Lanka include a small number of saltwater fish

b/ Imports from the Republic of the Philippines are mainly of saltwater fish

Source of data: Personal communication from Hong Kong Agriculture and Fisheries Department (1975)

Table 11

HONG KONG - Re-export of aquarium fishes (1969-73)
(in HK.$)

Country	1969	1970	1971	1972	1973
U.K.	15 725	-	-	-	-
Japan	25 399	7 078	-	2 423	-
Malaysia	22 539	14 427	16 062	11 347	15 676
Singapore	90 716	119 883	113 003	87 871	63 141
U.S.A.	-	-	1 722	14 308	1 443
Australia	-	-	-	-	7 622
Total	154 379	141 388	130 787	115 949	87 882

Source of data: Personal communication from Hong Kong Agriculture and Fisheries Department (1975)

Table 12

INDONESIA - Exports of ornamental fish (1968-74)

Year	Volume (kg)	Value[a] (U.S.$)
1968	23 106	32 870
1969	41 659	19 963
1970	96 585	34 171
1971	100 037	28 221
1972	190 000	37 000
1973[b]	286 000	56 000
1974[c]	181 000	28 000

a/ F.O.B. value

b/ Preliminary figures

c/ Up to August 1974

Source of data: "Fisheries Statistics of Indonesia, 1972", Directorate General of Fisheries, Department of Agriculture, Jakarta (1973)

Personal communication from Directorate General of Fisheries (1974)

Table 13

INDONESIA - Exports of ornamental fish by country of destination (1971)

Country of destination	Value (U.S.$)	Percent
1. AMERICA		
U.S.A.	3 676	12.67
2. ASIA		
Hong Kong	1 511	5.21
Japan	483	1.66
Singapore	12 476	43.02
3. AUSTRALASIA		
Australia/Oceania	75	0.26
4. EUROPE		
Belgium/Luxembourg	513	1.77
Fed. Rep. of Germany	4 096	14.12
France	170	0.59
Italy	380	1.31
The Netherlands	2 764	9.53
U.K.	150	0.52
5. OTHER COUNTRIES	2 674	9.22
Total	28 998	

Table 14

ISRAEL - Exports of aquarium fishes to various countries (1959-72)

Year	Volume (tons)	Value (U.S.$)
1959	?	1 854
1960	?	1 706
1961	?	6 007
1967-70	(no data)	(no data)
1971	0.4	681
1972	0.1	430

Source of data: "Israel Fisheries, 1972", State of Israel, Ministry of Agriculture, Department of Fisheries (1973)
"Israel Fisheries, 1971", idem (1972)
"Israel Fisheries, 1970", idem (1971)
"Israel Fisheries, 1969", idem (1970)
"Israel Fisheries, 1968", idem (1969)
"Israel Fisheries, 1967", idem (1968)
"Israel Fisheries, 1966", idem (1967)
"Israel Fisheries, 1960", idem (1961)

Table 15

JAPAN - Imports of living animals (fishery products)

Year	Value
	U.S.$
1964	2 853 000
1965	1 486 000
1966	2 587 000
1967	3 626 000
1968	4 868 000
1969	7 625 000
	Yen[a/]
1970	5 851 000 000
1971	7 779 '00 000
1972	12 418 000 000

a/ U.S.$ 1.00 = Yen 4.87 (May 1975)

Table 16

JAPAN - Imports of living animals (fishery products) by country of origin

Country of origin	1966[a]	1967[a]	1968[a]	1969[a]	1970[b]	1971[b]	1972[b]
1. AMERICA							
Brasil	-	-	3	2	-	-	-
Canada	-	1	1	-	4	1	1
Mexico	-	2	-	-	-	-	-
Peru	1	-	3	-	1	-	-
U.S.A.	292	501	527	480	132	142	191
2. ASIA							
China	1	-	-	9	165	38	61
Hong Kong	449	843	1 244	1 342	385	290	242
Indonesia	1	-	11	-	51	5	7
Korea	903	1 002	1 322	1 671	1 274	1 536	1 880
Philippines	-	-	19	47	38	-	-
Ryukyu Island	198	286	431	406	114	210	-
Singapore	362	394	519	-	-	-	-
Taiwan	140	277	462	2 051	3 170	4 943	8 856
Thailand	205	227	261	300	98	102	81
3. AUSTRALIA							
Australia	-	-	3	2	-	-	-
4. EUROPE							
Spain	-	-	1	-	-	-	-
U.K.	-	7	-	-	-	-	-
5. OTHER COUNTRIES	35	85	63	1 317	419	511	1 099
Total	2 587	3 625	4 868	7 625	5 851	7 779	12 418

a/ U.S.$ '000

b/ Yen 1 million

Table 17

KOREA - Exports of alive fish (1963-69)

Year	Volume (metric tons)	Value (K.Won)
1963	1 795	658 000
1964	2 611	984 000
1965	3 107	1 091 000
1966	4 694	1 755 000
1967	5 500	2 456 000
1968	6 310	2 750 000
1969	1 765	3 025 000[a]

a/ U.S.$ 1.00 = K.Won 281.70 (January 1969)
U.S.$ 1.00 = K.Won 304.55 (December 1969)

Source of data: "Yearbook of Fisheries Statistics, 1970", Office of Fisheries, Republic of Korea
"Yearbook of Fisheries Statistics, 1972", idem
"Yearbook of Fisheries Statistics, 1973", idem

Table 18

KOREA - Exports of alive fish by country of destination

Year	Japan		U.S.A.		Total	
	Volume (metric tons)	Value (K.Won)	Volume (metric tons)	Value (K.Won)	Volume (metric tons)	Value (K.Won)
1966	4 694	1 755 000	-	-	4 694	1 755 000
1967	5 498	2 454 000	2	2 000	5 500	2 456 000
1968	6 310	2 750 000	-	-	6 310	2 750 000
1969	?	3 016 000	?	9 000	1 765	3 025 000

Source of data: "Yearbook of Fisheries Statistics, 1970", Office of Fisheries, Republic of Korea
"Yearbook of Fisheries Statistics, 1972", idem
"Yearbook of Fisheries Statistics, 1973", idem

Table 19

LAOS - Imports and national production of ornamental fish (1974)

Fish species	National production		Importation	
	Number of fish	Value (Kip)[a/]	Number of fish	Value (Kip)
Lebistes reticulatus	1 000	100 000	1 000	300 000
Mollienesia latipinna	-	-	100	50 000
M. sphenops	-	-	100	30 000
Xiphophorus helleri	3 000	900 000	4 000	1 200 000
X. maculatus	1 000	100 000	1 000	300 000
Anentichthys jordani	-	-	500	500 000
Gymnocorymbus ternetzi	-	-	500	175 000
Hyphessobrycon flammeus	-	-	500	150 000
H. innesi	-	-	500	350 000
Thayeria sanctae-mariae	-	-	500	150 000
Barbus tetrazona	-	-	1 000	300 000
Brachydanio rerio	-	-	500	150 000
Carassius auratus	2 000	200 000	10 100	2 000 000
Cyprinus carpio	-	-	100	50 000
Labeo bicolor	-	-	300	450 000
Rasbora trilineata	-	-	300	90 000
Acanthophthalmus semicinctus	-	-	200	60 000
Kryptopterus macrocephalus	-	-	300	90 000
Betta splendens	-	-	2 000	800 000
Colisa lalia	-	-	100	200 000
Helostoma rudolphi	-	-	500	150 000
Trichogaster leeri	-	-	500	150 000
Astronotus ocellatus	-	-	1 020	700 000
Haplochromis strigatus	-	-	100	30 000
Pterophyllum scalare	1 000	300 000	3 050	1 050 000
Symphysodon discus	-	-	110	550 000
Chanda ranga	-	-	100	20 000
Total	8 000	1 600 000	28 980	10 045 000

a/ U.S.$ 1.00 = Kip 840.00 (May 1975)

Source of data: Personal communication from the Sub-Director of Fisheries, Ministry of National Economy, Vientiane (1975)

Table 20

MALAYSIA (STATE OF SABAH) - Imports of aquarium fishes (1971)[a/]
(Number of fish)

Month	Port of entry			Total
	Kota Kinabalu	Sandakan	Tawau	
January	-	1 900	-	1 900
February	2 033	2 100	-	4 133
March	6 000	3 150	1 470	10 620
April	-	2 150	-	2 150
May	3 020	1 900	-	4 920
June	3 145	1 034	-	4 179
July	2 000	2 250	760	5 010
August	2 100	2 620	1 010	5 730
September	4 052	1 100	800	5 952
October	2 017	46	-	2 063
November	2 000	2 150	-	4 150
December	4 157	2 000	550	6 707
Total	30 524	22 400	4 590	57 514

a/ The value of these imports was M.$ 14 731
U.S.$ 1.00 = M.$ 2.25 (May 1975)

Source of data: "Annual Report of the Department of Fisheries, Sabah, 1971" (1972)

Table 21

MALAYSIA (WEST) - Exports of fish for aquaria (1964-72)

Year	Number of fish	Value (M.$)
1964	923 406	48 663
1965	1 714 685	59 010
1966	1 328 006	66 322
1967	1 900 915	85 012
1968	91 160	8 712
1969	1 377 522	52 809
1970	5 424 579	156 644
1971	4 715 180	248 856
1972	4 328 946	289 848

Source of data: "Annual Statistics, 1968", Ministry of Agriculture and Fisheries, Malaysia, Fisheries Division
"Annual Statistics, 1969", idem
"Annual Fisheries Statistics, West Malaysia, 1970", Ministry of Agriculture and Fisheries, Fisheries Division, Kuala Lumpur (1971)
"Annual Fisheries Statistics, West Malaysia, 1971", idem (1972)
"Annual Fisheries Statistics, West Malaysia, 1972", idem (1973)

Table 22

MALAYSIA (WEST) - Imports of fish for aquaria (1964-72)

Year	Number of fish	Value (M.$)
1964	1 459 004	208 594
1965	1 219 681	177 167
1966	926 437	126 944
1967	1 054 965	138 852
1968	3 507 875	176 658
1969	1 909 650	102 771
1970	233 556	67 700
1971	1 311 291	40 723
1972	866 762	61 640

Source of data: "Annual Statistics, 1968", Ministry of Agriculture and Fisheries, Malaysia, Fisheries Division
"Annual Statistics, 1969", idem
"Annual Fisheries Statistics, West Malaysia, 1970", Ministry of Agriculture and Fisheries, Fisheries Division, Kuala Lumpur (1971)
"Annual Fisheries Statistics, West Malaysia, 1971", idem (1972)
"Annual Fisheries Statistics, West Malaysia, 1972", idem (1973)

Table 23

MALAYSIA (WEST) - Exports of fish for aquaria by country of destination (1972)

Country of destination	Number of fish	Value (M.$)	Percent
1. AMERICA			
U.S.A.	7 690	1 977	0.68
2. ASIA			
Hong Kong	52 550	9 073	3.13
Indonesia	18 300	662	0.29
Japan	2 500	1 048	0.36
Singapore	4 046 955	259 481	89.52
3. EUROPE			
U.K.	181 951	9 888	3.41
4. OTHER COUNTRIES	1 900	7 719	2.66
Total	4 328 946	289 848	

Source of data: "Annual Fisheries Statistics, West Malaysia, 1972", Ministry of Agriculture and Fisheries, Fisheries Division, Kuala Lumpur (1973)

Table 24

MALAYSIA (WEST) - Imports of fish for aquaria by country of origin (1972)

Country of origin	Number of fish	Value (M.$)	Percent
1. ASIA			
Hong Kong	579 270	18 253	29.61
Indonesia	22 592	1 143	1.85
Japan	15 972	7 806	12.66
Singapore	239 148	30 427	49.36
Thailand	4 600	305	0.49
2. OTHER COUNTRIES	5 180	3 706	6.01
Total	866 762	61 640	

Source of data: "Annual Fisheries Statistics, West Malaysia, 1972", Ministry of Agriculture and Fisheries, Fisheries Division, Kuala Lumpur (1973)

Table 25

MEXICO - Imports of fishery products (1970)

Item	Product	Number	Value (Mex.$) a/
0 301 A011	Live fish for reproduction	15 457	21 228
0 301 A012	Live fish except the previous item	83 645	333 627

a/ U.S.$ 1.00 = Mex.$ 12.50 (May 1975)

Source of data: Dirección General de Estadística, S.I.C.P.

Table 26

PERU - Exports of ornamental fish (1970)

Country of destination	Number of fish	Value		Percent
		(Per.Sol. '000)	(U.S.$ '000)	
1. AMERICA				
Argentina	9 050	18.4	0.5	0.14
Canada	110 070	171.6	4.5	1.28
Mexico	69 110	101.7	2.5	0.71
U.S.A.	13 392 679	12 819.1	331.2	93.64
2. ASIA				
Japan	1 700	15.8	0.4	0.11
Pacific Islands	3 740	6.4	0.1	0.03
3. EUROPE				
Austria	4 490	6.9	0.2	0.06
Belgium/ Luxembourg	23 200	44.1	1.2	0.34
Fed. Rep. of Germany	201 670	364.9	9.3	2.63
France	6 550	10.6	0.3	0.08
Italy	18 000	38.9	1.1	0.31
The Netherlands	56 170	85.6	2.3	0.65
Switzerland	400	0.9	-	-
U.K.	2 000	3.4	0.1	0.03
Total	13 898 829	13 688.3	353.7	

Source of data: "Anuario Estadístico Pesquero, Vol. 1", Ministerio de Pesquería, Lima (1970)

Table 27

PERU - Exports of ornamental fish by air ex Lima (1970)

Month	Number of fish	Value	
		(Per.Sol. '000)	(U.S.$ '000)
January	848 831	792.6	20.5
February	742 285	701.2	18.1
March	613 531	567.2	14.6
April	1 393 340	1 295.7	33.5
May	1 138 990	1 024.8	26.5
June	965 380	882.6	22.8
July	1 423 166	1 585.8	41.0
August	1 385 410	1 387.1	35.8
September	1 686 466	1 712.9	44.3
October	1 774 022	1 773.4	45.8
November	1 173 256	1 191.7	30.8
December	754 152	773.3	20.0
Total	13 898 829	13 688.3	353.7

Source of data: "Anuario Estadístico Pesquero, Vol. 1", Ministerio de Pesquería, Lima (1970)

Table 28

PERU - Exports of ornamental fish (1971)

Country of destination	Number of fish	Value		Percent
		(Per.Sol. '000)	(U.S.$ '000)	
1. AMERICA				
Argentina	2 600	8.1	0.2	0.06
Canada	151 800	250.7	6.5	1.83
Mexico	125 090	302.5	7.9	2.22
U.S.A.	12 262 250	12 429.3	321.3	90.48
2. ASIA				
Japan	600	8.1	0.2	0.06
Pacific Islands	3 200	5.7	0.1	0.03
3. EUROPE				
Belgium/Luxembourg	15 740	38.8	1.0	0.28
Fed. Rep. of Germany	273 690	555.1	14.5	4.08
France	14 350	22.4	0.6	0.17
Italy	11 400	26.9	0.7	0.20
The Netherlands	47 800	86.2	2.1	0.59
Total	12 908 520	13 733.8	355.1	

Source of data: "Anuario Estadístico Pesquero, Vol. 2", Ministerio de Pesquería, Lima (1971)

Table 29

PERU - Exports of internal movements of ornamental fish (1974)

Month	Number of fish exported	Number of fish to Lima	Total
January	1 344 315	131 755	1 476 070
February	1 286 296	148 422	1 484 713
March	700 701	111 378	812 079
April	658 563	182 260	841 510
May	679 650	112 260	791 910
June	898 166	114 764	1 012 930
July	1 160 555	75 136	1 235 691
August	2 123 385	173 936	2 297 321
September	1 710 990	170 501	1 881 491
October	1 456 521	158 675	1 615 196
November	1 279 367	162 092	1 441 459
December	799 008	54 270	853 278
Total	14 097 517	1 646 136	15 743 653

Source of data: Empresa Pública de Certificaciones Pesqueras del Perú, Lima (1975)

Table 30

PERU - Exports of ornamental fish by regions and ports of embarkation (1971)

Region	Port of embarkation	Number of fish	Value (U.S.$)
North	Lima (air)	11 534 545	292 200
Central	Iquitos (air)	1 373 975	62 900
Total		12 908 520	355 100

Source of data: "Anuario Estadístico Pesquero, Vol. 2", Ministerio de Pesquería, Lima (1971)

Table 31

PHILIPPINES - Exports of fresh live-fish (1968-71)

Year	Volume (kg)	Value	
		(P.Ps.)	(U.S.$) [a/]
1968	33 931	153 229	25 538
1969	79 464	428 694	71 449
1970	142 273	1 000 263	166 711
1971	184 633	1 693 366	282 228

a/ U.S.$ 1.00 = P.Ps. 6.00 (June 1970)

Source of data: "Fisheries Statistics of the Philippines, 1971", Bureau of Fisheries Economics and Information Division, Manila

Table 32

PHILIPPINES - Exports of fresh live-fish by country of destination (1968)

Country of destination	Volume (kg)	Value (P.Ps.)	Percent
Fed. Rep. of Germany	4 356	36 160	23.59
Japan	622	11 434	7.46
U.S.A.	26 911	85 517	55.81
Other countries	2 042	20 118	13.13
Total	33 931	153 229	

Source of data: "Fisheries Statistics of the Philippines, 1969", Bureau of Fisheries Economics and Information Division, Manila

Table 33

PHILIPPINES - Exports of fresh live-fish by country of destination (1969)

Country of destination	Volume (kg)	Value (P.Ps.)	Percent
Fed. Rep. of Germany	18 902	77 503	18.08
Japan	6 529	83 728	19.53
U.S.A.	40 476	194 863	45.45
Other countries	13 557	72 600	16.94
Total	79 464	428 694	

Source of data: "Fisheries Statistics of the Philippines, 1969", Bureau of Fisheries Economics and Information Division, Manila

Table 34

PHILIPPINES - Exports of fresh live-fish by country of destination (1970)

Country of destination	Volume (kg)	Value (P.Ps.)	Percent
Fed. Rep. of Germany	38 595	169 521	16.95
Japan	20 567	238 181	23.81
U.S.A.	57 165	421 942	42.18
Other countries	25 946	170 619	17.06
Total	142 273	1 000 263	

Source of data: "Fisheries Statistics of the Philippines, 1971", Bureau of Fisheries Economics and Information Division, Manila

Table 35

PHILIPPINES - Exports of fresh live-fish by country of destination (1971)

Country of destination	Volume (kg)	Value (P.Ps.)	Percent
Fed. Rep. of Germany	29 135	201 642	11.91
Japan	25 154	293 195	17.31
U.S.A.	85 985	822 572	48.57
Other countries	44 359	376 017	22.21
Total	184 633	1 693 366	

Source of data: "Fisheries Statistics of the Philippines, 1971", Bureau of Fisheries Economics and Information Division, Manila

Table 36

PHILIPPINES - Imports of live fish (1970)

Country of origin	Volume (kg)	Value (P.Ps.)	Percent
China	-	-	-
Japan	37	430	67.72
Singapore	12	205	32.28
Total	49	635	

Source of data: "Fisheries Statistics of the Philippines, 1971", Bureau of Fisheries Economics and Information Division, Manila

Table 37

PHILIPPINES - Imports of live fish (1971)

Country of origin	Volume (kg)	Value (P.Ps.)	Percent
China	91	1 143	63.85
Japan	15	209	11.67
Singapore	34	438	24.47
Total	140	1 790	

Source of data: "Fisheries Statistics of the Philippines, 1971", Bureau of Fisheries Economics and Information Division, Manila

Table 38

SRI LANKA - Exports of live fish (1961-66)

Year	Volume (cwt)	Value (Cey.Res.) a/
1961-62	606	173 754
1962-63	970	219 603
1963-64	?	258 871
1964-65	?	329 425
1965-66	?	289 669

a/ U.S.$ 1.00 = Cey.Res. 6.57 (May 1975)

Table 39

THAILAND - Exports of fish and fish products including fish for aquarium and live fish (1961-69)

Year	Volume (tons)	Value (Baht '000)
1961	6 744	28 625
1962	7 173	34 578
1963	7 490	67 602
1964	9 080	90 866
1965	12 712	138 358
1966	15 985	225 878
1967	16 068	282 010 a/
1968	15 202	302 939 b/
1969	17 946	298 946

a/ U.S.$ 1.00 = Baht 20.57

b/ U.S.$ 1.00 = Baht 20.67

Source of data: "Fisheries Record of Thailand, 1968", Statistics Section, Department of Fisheries, Bangkok (1970)
"Fisheries Record of Thailand, 1969", idem (1971)

Table 40

THAILAND - Imports of fish and fish products including fish for aquarium and live fish (1961-69)

Year	Volume (tons)	Value (Baht '000)
1961	761	2 629
1962	31	337
1963	62	592
1964	376	1 073
1965	1 419	2 634
1966	1 664	3 436
1967	2 133	4 117
1968	1 730	5 819
1969	1 720	7 155

Source of data: "Fisheries Record of Thailand, 1968", Statistics Section, Department of Fisheries, Bangkok (1970)
"Fisheries Record of Thailand, 1969", idem (1971)

Table 41

THAILAND - Exports of fishes (fresh or alive) by country of destination (1966)

Country of destination	Volume (tons)	Value (Baht '000)	Percent
Japan	32	625	1.77
Malaysia	8 844	31 825	90.14
U.S.A.	14	1 025	2.90
Other countries	110	1 829	5.18
Total	9 000	35 304	

Source of data: "Fisheries Record of Thailand, 1968", Statistics Section, Department of Fisheries, Bangkok (1970)
"Fisheries Record of Thailand, 1969", idem (1971)

Table 42

THAILAND - Exports of fishes (fresh or alive) by country of destination (1967)

Country of destination	Volume (tons)	Value (Baht '000)	Percent
Japan	29	823	3.61
Malaysia	6 993	17 551	76.92
U.S.A.	29	1 780	7.80
Other countries	189	2 664	11.67
Total	7 240	22 818	

Source of data: "Fisheries Record of Thailand, 1968", Statistics Section, Department of Fisheries, Bangkok (1970)
"Fisheries Record of Thailand, 1969", idem (1971)

Table 43

THAILAND - Exports of fishes (fresh or alive) by country of destination (1968)

Country of destination	Volume (tons)	Value (Baht '000)	Percent
Japan	11	1 111	4.44
Malaysia	7 658	15 957	63.77
U.S.A.	45	4 100	16.39
Other countries	198	3 853	15.40
Total	7 912	25 021	

Source of data: "Fisheries Record of Thailand, 1968", Statistics Section, Department of Fisheries, Bangkok (1970)
"Fisheries Record of Thailand, 1969", idem (1971)

Table 44

THAILAND - Exports of fishes (fresh or alive) by country of destination (1969)

Country of destination	Volume (tons)	Value (Baht '000)	Percent
Japan	12	1 020	3.57
Malaysia	9 570	17 830	62.47
U.S.A.	180	6 928	24.27
Other countries	51	2 765	9.69
Total	9 813	28 543	

Source of data: "Fisheries Record of Thailand, 1968", Statistics Section, Department of Fisheries, Bangkok (1970)
"Fisheries Record of Thailand, 1969", idem (1971)

Table 45

THAILAND - Imports of fishes (fresh or alive) by country of origin (1966)

Country of origin	Volume (tons)	Value (Baht '000)	Percent
Burma	172	411	11.96
Japan	6	636	18.51
Malaysia	1 468	1 535	44.67
Taiwan	3	511	14.87
Other countries	15	343	9.98
Total	1 664	3 436	

Source of data: "Fisheries Record of Thailand, 1968", Statistics Section, Department of Fisheries, Bangkok (1970)
"Fisheries Record of Thailand, 1969", idem (1971)

Table 46

THAILAND - Imports of fishes (fresh or alive) by country of origin (1967)

Country of origin	Volume (tons)	Value (Baht '000)	Percent
Burma	200	486	11.80
Japan	7	689	16.74
Malaysia	1 900	2 104	51.11
Taiwan	2	297	7.21
Other countries	24	541	13.14
Total	2 133	4 117	

Source of data: "Fisheries Record of Thailand, 1968", Statistics Section, Department of Fisheries, Bangkok (1970)
"Fisheries Record of Thailand, 1969", idem (1971)

Table 47

THAILAND - Imports of fishes (fresh or alive) by country of origin (1968)

Country of origin	Volume (tons)	Value (Baht '000)	Percent
Burma	164	398	6.84
Japan	18	977	16.79
Malaysia	1 428	2 573	44.22
Taiwan	2	112	1.92
Other countries	118	1 759	30.23
Total	1 730	5 819	

Source of data: "Fisheries Record of Thailand, 1968", Statistics Section, Department of Fisheries, Bangkok (1970)
"Fisheries Record of Thailand, 1969", idem (1971)

Table 48

THAILAND - Imports of fishes (fresh or alive) by country of origin (1969)

Country of origin	Volume (tons)	Value (Baht '000)	Percent
Burma	219	569	7.95
Japan	29	1 327	18.55
Malaysia	1 425	4 492	62.78
Taiwan	3	194	2.71
Other countries	44	573	8.01
Total	1 720	7 155	

Source of data: "Fisheries Record of Thailand, 1968", Statistics Section, Department of Fisheries, Bangkok (1970)
"Fisheries Record of Thailand, 1969", idem (1971)

Table 49

THAILAND - Exports of other products (includes shells, live fish, insignificant quantities of fish and marine animal oil, and fish for aquaria) (1963-68)

Year	Volume (metric tons)	Value (U.S.$)
1963	72	?
1964	76	?
1965	115	?
1966	122	?
1967	76	27 000
1968	56	22 000

Source of data: "Annual Statement of Foreign Trade of Thailand, 1963-66", Department of Customs, Bangkok
"Annual Statement of Foreign Trade of Thailand, 1968, idem

Table 50

U.S.A. - Imports of fish or shellfish (live) to be used for purposes other than human consumption (January-November 1973)

Country of origin	Value (U.S.$)	Percent
1. AFRICA		
Burundi	16 576	0.19
Malawi	60 971	0.69
Nigeria	63 278	0.72
Zaire	15 146	0.17
2. AMERICA		
Brasil	341 518	3.86
Canada	71 294	0.81
Colombia	832 519	9.41
Guyana	651 197	7.36
Haiti	18 197	0.20
Peru	438 557	4.95
Trinidad	52 304	0.59
Venezuela	68 448	0.77
3. ASIA		
Hong Kong	2 072 187	23.42
Indonesia	149 921	1.69
Japan	116 847	1.32
Philippines	477 340	5.39
Singapore	1 106 398	12.50
Taiwan	535 975	6.01
Thailand	1 665 533	18.82
4. EUROPE		
Fed. Rep. of Germany	14 179	0.16
5. OTHER COUNTRIES	81 257	0.92
Total	8 849 661	

Source of data: "U.S. Foreign Trade, Imports, Commodity by Country", FT 135/November 1973 (issued: February 1974)

Table 51

U.S.A. - Imports of aquarium fish (including goldfish) (1968-70)

Year	Value (U.S.$)
1968	2 169 000
1969	2 740 000
1970	3 495 000

Source of data: "Fishery Statistics of the United States, 1969", U.S. Department of Commerce, N.O.A.A., National Marine Fisheries Service, Statistical Digest No. 63
"Fishery Statistics of the United States, 1970", idem No. 64

Table 52

VENEZUELA - Imports and exports of fish for aquaria (1972)

Item	Volume (kg)	Value (V.Bs.)[a]
Imports	27 004	346 440
Exports	19 547	133 386

a/ U.S.$ 1.00 = V.Bs. 4.28 (May 1975)

Source of data: "Anuario Estadístico Agropecuario, 1972", Ministerio de Agricultura y Cría, Caracas

APPENDIX II

Table 53

ARGENTINA - Wholesale prices of freshwater ornamental fish (1974)

Fish Species	Unit Price (U.S.$)
Aequidens awani	0.06
A. tetramerus	0.06
Aparelodon maculatus	0.20
Aphyocharax rubripinnis	0.06
Apistogramma reitzigi	0.06
Bunocephalus coracoideus	0.10
Corydoras aeneus	0.06
C. cochui	0.06
C. hastatus	0.05
Geophagus brachirus	0.10 - 0.50
Gymnotus carapo	0.20
Hoplias malabaricus	0.10
Hyphessobrycon federalis	0.08
H. serpae	0.06
Lepidosiren paradoxus	1.00 - 8.00
Metynnis maculatus	0.15 - 0.20
Prionobrama filigera	0.12
Pseudocurimata nitens	0.10
Pyrrhulina brevis	0.06

Table 54

BRASIL - Wholesale prices of freshwater ornamental fish (1973)

Fish Species	Unit Price (U.S.$)	
	Supplier No. 1	Supplier No. 2
Abramites sp.	0.25	0.30
Acanthodoras spinossisimus	0.10 - 0.15	-
Anostomus anostomus	0.60	-
A. trimaculatus	0.60	-
Apistogramma sp.	0.25	0.25
Astronotus ocellatus	0.50	-
Bunocephalus coracoideus	0.15	0.15
Carnegiella strigata	0.04	0.04
Chalceus sp.	-	1.00
Cheirodon axelrodi	0.035 - 0.05	0.04 - 0.10
Chilodus punctatus	0.10	0.10
Cichlasoma facetum	0.20	-
C. festivum	0.15	0.10
C. severum	0.15	0.10
Copeina arnoldi	-	0.03
C. callolepis	-	0.03
C. guttata	0.04	0.03
Corydoras aeneus	0.04	0.05
C. julii	0.04	0.05

Table 54 (continued)

Fish Species	Unit Price (U.S.$)	
	Supplier No.1	Supplier No.2
Corydoras punctatus	0.04	-
C. schwartzi	-	0.05
Crenicara maculata	0.10 - 0.20	0.05
Diadema urostriata	0.60	0.60
Electrophorus electricus	4.00 - 6.00	3.00
Farlowella sp.	0.25	0.25
Gasteropelecus sternicla	-	0.04
Geophagus jurupari	-	0.25
Gymnotus carapo	0.15	-
Hemigrammus rhodostomus	0.05	0.06
Hemiodus gracilis	-	0.60
Hoplosternum littorale	0.20	-
Hyphessobrycon innesi	-	0.03 - 0.06
H. rosaceus	0.03	0.03
H. rubrostigma	0.08	0.06
H. simulans	-	0.04
Hypomus artedi	-	0.25 - 0.30
Lepidosiren paradoxus	-	10.00
Leporinus fasciatus	0.25	0.30
L. frederici	-	0.25
Loricaria parva	0.10	0.10
Metynnis schreitmuelleri	-	1.00 - 3.00
Metynnis sp.	0.10 - 0.30	0.15 - 1.00
Microglanis parahybae	-	0.20
Moenkhausia oligolepis	-	0.10
Monocirrhus polyacanthus	-	0.30
Myleusoma sp.	-	0.10
Nannostomus marginatus	-	0.04
N. trifasciatus	-	0.05
Otocinclus arnoldi	0.03	0.04
Paratrygon laticeps	2.00 - 3.00	3.00
Plecostomus sp.	0.25	0.25
Poecilobrycon auratus	0.05	0.04
Prochilodus insignis	0.25	0.30 - 0.60
P. taeniurus	0.30	-
Pterophyllum scalare	0.30	0.15 - 0.40
Sorubim lima	3.00	3.00
Sternarchus albifrons	1.20	1.20
Symphysodon discus	1.10 - 18.00	1.00 - 15.00
Tetraodon sp.	0.10	-

Table 55

COLOMBIA - Wholesale prices of freshwater ornamental fish (1974)

Fish Species	Unit Price (U.S.$)	
	Supplier No.1	Supplier No.2
Abramites microcephalus	-	0.50
Aequidens itanyi	-	0.20
Anostomus taeniata	-	0.20
A. trimaculatus	0.20	0.40
Apistogramma ramirezi	0.10	0.08
Apistogramma sp.	-	0.10
Astronotus ocellatus	-	0.30
Axelrodia riesei	0.04	0.05
Brochis coeruleus	-	0.08
Bunocephalus coracoideus	0.10	0.08
Callichthys callichthys	0.10	0.10
Carnegiella marthae	-	0.08
Chalceus macrolepidotus	-	0.35
Charax gibbosus	0.10	0.10
Cheirodon axelrodi	0.04 - 0.05	0.035
Chilomus punctatus	0.10	0.09
Cichla ocellaris	-	0.25 - 0.70
Cichlasoma festivum	0.08	0.10
C. severum	0.10	0.15
Colisa fasciata	-	0.06
Colisa lalia	-	0.07
C. arcuatus	0.06	-
C. arcuatus	0.07	0.07
C. elegans	0.06	0.07
C. hastatus	-	0.06
C. julii	-	0.07
C. meteo	0.10	0.07
C. punctatus	-	0.07
C. rabauti	-	0.07
Crenicara maculata	-	0.07
Crenicichla lepidota	-	0.15
Dianema urostriata	-	-
Electrophorus electricus	2.00	1.30
Exodon paradoxus	0.35	0.20
Farlowella sp.	0.10	0.09
Gasteropelecus sternicla	-	-
Geophagus surinari	0.30	0.22
Gymnotus carapo	0.15	0.12
Helogenes marmoratus	-	0.30
Hemigrammus armstrongi	0.04	0.045
H. pulcher	0.05	0.05
H. rhodostomus	0.05	0.07
Hemiodus gracilis	0.1 - 0.30	0.18 - 0.32
Hoplosternum littorale	-	0.15
Hyphessobrycon herbertaxelrodi	-	0.06
H. innesi	0.03 - 0.0	0.035
H. peruvianus	-	0.06
H. rosaceus	-	0.06
H. rubrostigma	-	0.07
H. serpae	-	0.07
Leporinus fasciatus	0.40	0.50
L. frederici	0.10	0.30
L. striatus	0.30	0.20

Table 55 (continued)

Fish Species	Unit Price (U.S.$)	
	Supplier No.1	Supplier No.2
Loricaria parva	-	0.09
Metynnis sp.	0.10 - 0.40	0.15
Microbrycon fredcochui	0.06	0.06
Monocirrhus polyacanthus	-	0.50
Myloplus asterias	-	0.85
Mylonnoma argenteum	-	0.60
Mylosoma sp.	0.10	0.15
Nannostomus marginatus	-	0.05
N. trifasciatus	-	0.07
Nematobrycon amphiloxus	-	0.35
N. palmeri	-	0.22
Otocinclus arnoldi	0.03	0.045
Paratrygon laticeps	2.00	1.70
Pimelodella cristatus	0.35	0.30
P. gracilis	-	0.15
Pimelodus pictus	-	0.30
Hypostomus plecostomus	0.15	-
Poecilobrycon auratus	0.05	-
Prochilodus insignis	-	0.70
Pterophyllum altum	-	3.50
P. scalare	-	0.45
Pygidium boycotense	-	0.25
Rivulus sp.	0.08	0.10
Sorubim lima	-	0.40 - 3.00
Symphysodon discus	-	2.20

Table 56

GUYANA - Wholesale prices of freshwater ornamental fish (1973)

Fish Species	Unit Price (U.S.$)
Abramites sp.	0.30
Acanthodoras spinosissimus	0.10
Anostomus anostomus	0.50
Bunocephalus coracoideus	0.10
Callichthys callichthys	0.08
Carnegiella strigata	0.04
Cheirodon axelrodi	0.065
Chilodus punctatus	0.20
Cichlasoma festivum	0.08
C. severum	1.50
Copeina arnoldi	0.025
C. guttata	0.025
Corydoras aeneus	0.10
C. barima	0.06
C. lydisia	0.08 - 0.09
C. julii	0.08
C. melanistius	0.04 - 0.06

Table 56 (continued)

Fish Species	Unit Price (U.S.$)
Corydoras punctatus	0.08
Crenicara maculata	0.15
Crenicichla lepidota	1.00
Diadema urostriata	0.75
Electrophorus electricus	5.00
Geophagus jurupari	0.14
Gymnotus carapo	0.20
Gasteropelecus levis	0.05
Hemigrammus armstrongi	0.04
H. gracilis	0.03
Hemiodus sp.	0.08
Hoplosternum thoracatum	0.10
Hemigrammus ocellifer	0.03
H. rhodostomus	0.08
Hypopomus artedi	0.03
Hyphessobrycon rosaceus	0.03
Hypostomus plecostomus	0.20
Leporinus fasciatus	0.75
Leporinus sp.	0.30
Loricaria parva	0.08
Metynnis maculatus	0.75
Metynnis sp.	0.55
Moenkhausia oligolepis	0.03
Nannostomus anomalus	0.03
N. marginatus	0.03
N. trifasciatus	0.065
Otocinclus sp.	0.06
Pimelodella sp.	0.03
Pristella riddlei	0.025
Prochilodus insignis	0.45
Pterophyllum scalare	0.35 - 0.50
Sternarchus albifrons	2.00
Symphysodon discus	1.25 - 4.00
Xenocara dolichoptera	0.20

Table 57

HAWAII - Wholesale prices of saltwater fish (1975)

Fish species		Unit Price (U.S.$)
Red-tailed surgeon	(Acanthurus achilles)	4.00
Golden-rimmed surgeon	(A. glaucopareius)	7.00
Olive surgeon	(A. olivaceus)	2.00 - 4.00
Convict tang	(A. triostegus)	1.00
Speckled wrasse	(Anampses cuvieri)	3.00 - 5.00
Red-tail wrasse (female)	(A. rubrocaudatus)	3.50
Red-tail wrasse (male)	(A. rubrocaudatus)	5.00
Frog fish	(Antennarius sp.)	6.00 - 12.00
White-spotted puffer	(Arothron meleagris)	1.00
White-lined triggerfish	(Balistes bursa)	1.50 - 3.50
Blenny	(Blennius sp.)	2.00
Coral hogfish	(Bodianus axillaris)	2.50
Pink queen	(Caesioperca thompsoni)	2.50
Pygmy angelfish	(Centropyge fisheri)	4.00
Lemon peel	(C. flavissimus)	5.50
Flaming angelfish	(C. loriculus)	15.00
Russet angelfish	(C. potteri)	3.00
Threadfin butterflyfish	(Chaetodon auriga)	2.00 - 4.00
Deepsea butterflyfish	(C. coracolla)	1.50
Blue-stripe butterflyfish	(C. fremblii)	2.00 - 3.00
Red-striped butterflyfish	(C. lunula)	2.00 - 4.00
Lemon butterfly	(C. miliaris)	1.50
Pebbled butterfly	(C. multicinctus)	1.50
Clown butterflyfish	(C. ornatissimus)	2.50 - 4.50
Neon-banded butterfly	(C. quadrimaculatus)	2.00 - 3.00
Tinker's butterfly	(C. tinkeri)	35.00
Redfin butterflyfish	(C. trifasciatus)	2.50
One-spot butterfly	(C. unimaculatus)	2.00 - 3.00
Flame wrasse	(Cirrhilabrus jordani)	7.50
Hilu	(Coris flavovittatas)	3.00 - 5.00
Red labrid	(C. gaimard)	3.00 - 4.50
Kole	(Ctenochaetus strigosus)	1.50
Turkey fish	(Dendrochirus brachypterus)	2.00 - 4.00
Long-nose butterflyfish	(Forcipiger flavissimus)	3.00 - 4.00
Longface (female)	(Gomphosus varius)	3.00
Longface (male)	(G. varius)	6.00
Dragon	(Hemipteronotus taeniurus)	3.50 - 5.00
Pyramid butterflyfish	(Hemitaurichthys zoster)	5.00 - 7.00
Poor man's Moorish idol	(Heniochus acuminatus)	2.50 - 3.00
Black-banded angelfish	(Holacanthus arcuatus)	5.00
Squirrel fish	(Holocentrus xantherythrus)	1.50
Moray-eel	(Gymnothorax sp.)	4.00
Cleaner fish	(Labroides phthirophagus)	2.50
Long-horned cowfish	(Lactoria cornuta)	3.00
Black-finned triggerfish	(Melichthys ringens)	4.00
Pink-tailed triggerfish	(M. vidua)	4.00
Short-nosed unicorn tang	(Naso brevirostris)	2.50 - 4.00
Smooth-head unicorn tang	(N. lituratus)	3.00 - 5.00
Spotted box fish	(Ostracion meleagris)	2.50
Long-nose hawkfish	(Oxycirrhites typus)	35.00
Arc-eyed hawkfish	(Paracirrhites arcatus)	2.00
Fantailed filefish	(Pervagor spilosoma)	2.00
Hawaiian lion fish	(Pterois sphex)	2.50 - 4.50
Humu humu	(Rhineacanthus aculeatus)	3.00 - 5.00
Orange-striped wrasse	(Stenojulis albovittata)	2.50
Sailfin leaf fish	(Taeniotus triacanthus)	2.50
Moorish idol	(Zanclus canescens)	3.50
Yellow tang	(Zebrasoma flavescens)	2.50
Sailfin tang	(Z. veliferum)	3.00 - 3.50
Sargassum triggerfish	(Xanthichthys ringens)	5.00

Table 58

HONG KONG - Wholesale prices of freshwater ornamental fish (1975)

Fish Species	Unit Price (U.S.$)a/
Hyphessobrycon scholzei	0.027
H. herbertaxelrodi	0.023 - 0.12
Gymnocorymbus ternetzi	0.016 - 0.10
Anoptichthys jordani	0.042
Aphyocharax rubropinnis	0.04
Prionobrama filigera	0.12 - 0.16
Hemigrammus caudovittatus	0.04
Phenacogrammus interruptus	1.40 - 3.80
Moenkhausia oligolepis	0.018 - 0.09
Hemigrammus gracilis	0.02 - 0.10
Chilodus punctatus	0.11 - 0.60
Hemigrammus ocellifer	0.02 - 0.10
Hyphessobrycon pulchripinnis	0.023 - 0.10
H. innesi	0.022 - 0.065
Poecilobrycon eques	0.08
P. auratus	0.028
P. unifasciatus	0.14
Thayeria obliqua	0.04
Hyphessobrycon flammeus	0.02
H. rosaceus	0.10
Ctenobrycon spilurus	0.045
Hyphessobrycon serpae	0.025 - 0.10
Hemigrammus nanus	0.023 - 0.10
Hypostomus plecostomus	0.04 - 0.06
Mollienesia sphenops	0.013 - 0.08
M. velifera	0.03 - 0.20
Apistogramma sp.	0.15 - 0.24
Barbus everetti	0.07
B. fasciatus	0.10 - 0.20
B. lateristriga	0.10 - 0.20
B. schwanenfeldi	0.065 - 0.28
B. conchonius	0.03
B. filamentosus	0.30
B. lineatus	0.10 - 0.20
B. sachsi	0.03
B. nigrofasciatus	0.04 - 0.22
Trichogaster leeri	0.02 - 0.22
T. pectoralis	0.11 - 0.42
T. microlepis	0.11 - 0.30
T. trichopterus	0.02 - 0.15
Colisa lalia	0.13
C. fasciata	0.04
C. chuna	0.06 - 0.10
Macropodus opercularis	0.045 - 0.06
Jordanella floridae	0.11 - 0.15
Aequidens pulcher	0.03
Cichlasoma severum	0.03
C. aureum	0.80
C. festivum	0.12
C. meeki	0.12
Astronotus ocellatus	0.045 - 0.20
Cichlasoma biocellatum	0.03
Apistogramma ramirezi	0.15 - 0.24
Aequidens maronii	0.12
Hemichromis fasciatus	0.028

a/ All prices quoted subject to 10% discount (1975)

Table 58 (continued)

Fish Species	Unit Price (U.S.$)a/
Pelmatochromis kribensis	0.09 - 0.50
Symphysodon discus	0.80 - 12.00
Etroplus maculatus	0.085
Danio malabaricus	0.029
Brachydanio albolineatus	0.022 - 0.03
B. nigrofasciatus	0.023
B. rerio	0.01
Toxotes jaculator	-
Botia macracantha	0.30 - 0.40
Misgurnus anguillicaudatus	0.03 - 0.05
Rasbora heteromorpha	0.034 - 0.08
R. trilineata	0.038 - 0.07
Balantiocheilus melanopterus	0.08 - 0.25
Labeo erythrurus	0.08 - 0.13
L. bicolor	0.30 - 0.40
Ophiocephalus sp.	0.12 - 3.00
Brachygobius xanthozona	0.03
Datnioides microlepis	0.45
Kryptopterus bicirrhis	0.08 - 0.12
Macrognathus aculeatus	0.11 - 0.15
Mastocembelus armatus	0.11 - 0.15
Epalzeorhynchus kallopterus	-

Table 59

PERU - Wholesale prices of freshwater ornamental fish (1973)

Fish Species	Unit Price (U.S.$)
Abramites sp.	0.25
Acanthodoras spinossisimus	0.03
Acanthodoras sp.	0.20
Anostomus sp.	0.25
Aphyocharax rubripinnis	0.04
Apistogramma agassizi	0.04
Apistogramma sp.	0.04
Arapaima gigas	5.00
Astronotus ocellatus	0.08
Brochis coeruleus	0.05
Bunocephalus coracoideus	0.08 - 0.15
Carnegiella marthae	0.03
C. strigata	0.03
Characidium sp.	0.03
Chilodus punctatus	0.04 - 0.06
Cichla ocellaris	-
Cichlasoma festivum	0.04
C. severum	0.05
Copeina arnoldi	0.03
C. callolepis	0.10
C. guttata	0.03
Corydoras arcuatus	0.05
C. elegans	0.03
C. hastatus	0.02

Table 59 (continued)

Fish Species	Unit Price (U.S.$)
Corydoras julii	0.05
C. melanistius	0.03
C. rabauti	0.06
Crenicara maculata	0.10
Ctenolucius hujeta	0.20
Eigenmannia sp.	0.06
Electrophorus electricus	3.00 - 10.00
Farlowella sp.	0.08
Gymnotus carapo	1.00
G. levis	-
Hemigrammus rhodostomus	0.05
H. ulreyi	0.03
Hemiodus semitaeniatus	0.03
Hoplosternum littorale	0.06
H. thoracatum	0.03
Hyphessobrycon innesi	0.025
H. peruvianus	0.03
H. rosaceus	0.02
H. rubrostigma	0.05
Hypostomus plecostomus	0.10
Lepidosiren paradoxum	5.00 - 8.00
Leporinus fasciatus	0.25
L. frederici	0.06
L. maculatus	0.10
Hemigrammus ocellifer	0.03
Loricaria parva	0.08
Metynnis roosevelti	0.20
Metynnis sp.	0.20
Microbrycon fredcochui	0.04
Moenkhausia oligolepis	0.03
Monocirrhus polyacanthus	0.25
Mylossoma sp.	0.10
Otocinclus sp.	0.03
Nannostomus trifasciatus	0.04
Osteoglossum bicirrhosum	0.80
Phractocephalus hemiliopterus	10.00
Pimelodella sp.	0.05
Prochilodus sp.	0.06
Pseudopimelodus transmontanus	0.40
Pterophyllum scalare	0.06 - 0.08
Rivulus urophthalmus	-
Serrasalmo sp.	-
Sorubim lima	0.25
Stoniella leopardus	0.05
Tetraodon sp.	0.12
Thayeria obliqua	0.04

Table 60

PHILIPPINES - Wholesale prices of saltwater fish (1975)

Fish Species		Unit Price (U.S.$)
Sergeant-major	(Abudefduf saxatilis)	0.45
Damselfish	(Abudefduf sp.)	0.10
Golden-rimmed surgeon	(Acanthurus glaucopareius)	4.00
Clown surgeon	(A. lineatus)	1.20 - 2.00
Olive surgeon	(A. olivaceus)	2.50
Convict tang	(A. triostegus)	2.50
Tang	(Acanthurus sp.)	1.00
Skunk-striped anemone fish	(Amphiprion akallopisos)	0.60
Saddle anemone fish	(A. ephippium)	0.80
Clown anemone fish	(A. percula)	0.20
False skunk-striped anemone fish	(A. perideraion)	0.35
Saddleback clown	(A. polymnus)	1.00 - 2.00
Maroon anemone fish	(A. tricinctus)	0.50
Yellow-tailed anemone fish	(A. xanthurus)	0.40 - 0.70
Anglerfish	(Antennarius hispidus)	1.50
Orbiculate clownfish	(Apogon orbicularis)	0.30
Reticulated blow fish	(Arothron reticularis)	0.80
Undulate triggerfish	(Balistapus undulatus)	1.20
White-lined triggerfish	(Balistes bursa)	0.80
Triggerfish	(Balistes sp.)	0.80
Clown triggerfish	(Balistoides niger)	12.00 - 18.00
Blenny	(Blennius sp.	0.50
Coral hogfish	(Bodianus axillaris)	2.00
Two-coloured parrot fish	(Bolbometopon bicolor)	3.50
Marine beta	(Calloplesiops altivelus)	10.00
Pygmy angelfish	(Centropyge argi)	2.00
Two-coloured angelfish	(C. bicolor)	2.00
Lemon peel	(C. flavissimus)	2.00
Black angelfish	(C. tibicen)	2.00
Pearly-scaled angelfish	(C. vroliki)	1.20
Bennet's butterflyfish	(Chaetodon bennetti)	3.00
Pearlscale butterfly	(C. chrysurus)	2.00
Black-blotched butterflyfish	(C. ephippium)	2.50
Red-striped butterflyfish	(C. lunula)	1.00
Meyer's butterflyfish	(C. meyeri)	3.00
Eight-banded butterflyfish	(C. octofasciatum)	1.00
Coral butterflyfish	(C. plebius)	1.20
Copperband butterflyfish	(C. rostratus)	1.50
One-spot butterflyfish	(C. unimaculatus)	1.00
Butterflyfish	(Chaetodon sp.)	0.50 - 1.00
Blue-green chromis	(Chromis caeruleus)	0.15
Red labrid	(Coris gaimard)	0.80
	(Coris sp.)	0.40 - 0.65
Vermiculated angelfish	(Chaetodontoplus mesoleucus)	1.20
Pufferfish	(Canthigaster sp.)	0.30
Three-spot damselfish	(Dascyllus trimaculatus)	0.12
Damselfish	(Dascyllus sp.)	0.10 - 0.12
Zebra lion fish	(Dendrochirus zebra)	0.60
Polka dot grouper	(Chromileptes altivelis)	2.00
Porcupinefish	(Diodon histrix)	1.20
Zebra pipefish	(Dunckerocampus dactyliophorus)	0.60
Blue-girdled angelfish	(Euxiphipops navarchus)	9.00 - 12.00
Six-barred angelfish	(E. sexstriatus)	5.00
Yellow-faced angelish	(E. xanthometapon)	10.00 - 14.00
Long-nosed butterflyfish	(Forcipiger flavissimus)	6.00
Longface	(Gomphosus varius)	1.80
Golden-striped grouper	(Grammistes sexlineatus)	1.00
Moray eel	(Gymnothorax undulatus)	0.50

Table 60 (continued)

Fish species		Unit Price (U.S.$)
Marble wrasse	(Halichoeres centriquadrus)	0.60
Goby	(Gobius sp.)	0.40
Half and half wrasse	(Hemigymnus melapterus)	0.60
Dragon wrasse	(Hemipteronotus taeniurus)	0.80
Poor man's Moorish idol	(Heniochus acuminatus)	2.00 - 3.00
Poor man's Moorish idol	(H. permutatus)	3.50
Humphead banner fish	(H. varius)	3.50
Sea horse	(Hippocampus sp.)	0.80
Three-spot angelfish	(Holacanthus trimaculatus)	5.00
Squirrelfish	(Holocentrus sp.)	0.75
Lo	(Lo vulpinus)	2.20
Cleaner fish	(Labroides dimidiatus	0.40
Long-horned cowfish	(Lactoria cornuta)	1.00
Red emperor	(Lutjanus sebae)	3.50
Pink-tail triggerfish	(Melichthys vidua)	3.50
Purple queen	(Pirolabrichthys tuka)	1.50
Smooth-head unicorn fish	(Naso lituratus)	2.00
Black triggerfish	(Odonus niger)	2.50
Box fish	(Ostracion sp.)	1.20
Blue surgeon	(Paracanthurus hepatus)	2.50 - 3.50
Orbiculate bat fish	(Platax orbicularis)	1.00 - 1.50
Long-finned bat fish	(P. pinnatus)	7.00
Long-finned bat fish	(P. teira)	1.50 - 2.00
Clown sweetlips	(Plectorhynchus chaetodonoides)	0.80
Oriental sweetlips	(P. orientalis)	0.50
Saltwater cat fish	(Plotosus anguillaris)	0.10
Grey angelfish	(Pomacanthus arcuatus)	5.00
Emperor angelfish	(P. imperator)	10.00 - 14.00
Semicircle angelfish	(P. semicirculatus)	3.50 - 5.00
Royal empress angelfish	(Pygoplites diacanthus)	5.00
Blue ribbon eel	(Rhinomuraena amboinensis)	6.00
Blue parrot fish	(Scarus jonesi)	1.20
Mandarin fish	(Synchiropus splendidus)	1.20 - 1.80
Pyretail wrasse	(Thalassoma lunare)	0.80
Banded-tail goat fish	(Upeneus vittatus)	1.20
Moorish idol	(Zanclus canescens)	1.80
Yellow tang	(Zebrasoma flavescens)	2.00
Sailfin tang	(Z. veliferum)	1.80

Table 61

SRI LANKA - Wholesale prices of freshwater ornamental fish (1975)

Fish Species		Unit Price (U.S.$)
Comb tail	(Belontia signata)	0.05 - 0.075
Climbing perch	(Anabas testudineus)	0.06
Dwarf panchax	(Aplocheilus blochi)	0.035
Ceylon panchax	(A. dayi)	0.05
Winged rasbora	(Chela laubuca)	0.065
Giant danio	(Danio malabaricus)	0.04 - 0.075
Flying barb	(Esomus danrica)	0.07
Stone sucker	(Garra ceylonensis)	0.06
Stinging catfish	(Heteropneustes fossilis)	0.06
Lesser loach	(Lepidocephalus thermalis)	0.03
Dwarf catfish	(Mystus keletius)	0.08
Striped dwarf catfish	(M. vittatus)	0.06
Striped loach	(Noemacheilus botia)	0.08
Spotted loach	(N. notostigma)	0.05
Snake head	(Ophiocephalus striatus)	0.045
Giant gourami	(Osphronemus goramy)	0.20
Marbled spiny eel	(Mastacembelus armatus)	0.15
Common spiny eel	(Macrognathus aculeatus)	0.10
Spike-tailed paradise fish	(Macropodus cupanus)	0.05
Swamp barb	(Puntius chola)	0.065
Cuming's barb	(P. cumingi)	0.06 - 0.07
Two-spot barb	(P. bimaculatus)	0.05
Long-snouted barb	(P. dorsalis)	0.065
Filamented barb	(P. filamentosus)	0.07
Nigger barb	(P. nigrofasciatus)	0.075
Cherry barb	(P. titteya)	0.06 - 0.10
Black-line barb	(P. pleurotaenia)	0.15
Tic-tac-toe barb	(P. ticto)	0.10
Greater black-spot barb	(P. sarana)	0.06
Banded barb	(P. vittatus)	0.035
Common rasbora	(Rasbora daniconius)	0.05
Ceylonese fire barb	(R. vaterifloris)	0.06
Tilapia	(Tilapia mossambica)	0.035
Snake-skin gourami	(Trichogaster pectoralis)	0.06

Table 62

SRI LANKA - Wholesale prices of saltwater (marine and brackishwater) fish (1975)

Fish species		Unit Price (U.S.$)
	(Adudefduf spp.)	0.25
Powder-blue surgeon	(Acanthurus leucosternon)	4.00 - 4.50
Clown surgeon	(A. lineatus)	3.00
Grey surgeon	(A. nigricans)	1.00
Convict tang	(A. triostegus)	1.00
Red clown	(Amphiprion frenatus)	0.90
	(A. melanopus)	0.80
Yellow-tailed anemone fish	(A. xanthurus)	0.90
Lyretail coralfish	(Anthias squamipinnis)	1.50
Cardinal fish	(Apogon spp.)	0.20
	(Balistapus aculeatus)	1.50
	(B. rectangulus)	2.00
Undulate triggerfish	(B. undulatus)	2.00
Clown triggerfish	(Balistoides niger)	50.00
Spotted triggerfish	(B. viridescens)	1.00
Sleeper goby	(Butis butis)	0.04
	(Canthigaster albovittatus)	2.50
Hawaiian sharp-nosed puffer	(C. jactator)	1.50
Sharp-nosed puffer	(C. solandri)	0.50
Sharp-nosed puffer	(C. valentini)	1.50
Horse mackerel	(Caranx spp.)	2.50
Dusky angelfish	(Centropyge bispinosus)	2.00
Threadfin butterflyfish	(Chaetodon auriga)	1.50
Pearlscale butterflyfish	(C. chrysurus)	5.00
Speckled butterflyfish	(C. citrinellus)	1.25
Pakistani butterflyfish	(C. collaris)	1.50
Black-blotched butterflyfish	(C. ephippium)	4.50
Saddled butterflyfish	(C. falcula)	3.00
	(C. guttatissimus)	1.75
	(C. kleini)	1.50
Lined butterflyfish	(C. lineolatus)	3.00
Red-striped butterflyfish	(C. lunula)	2.00
Black-backed butterflyfish	(C. melanotus)	1.50
Meyer's butterfly	(C. meyeri)	3.50
	(C. ornatissimus)	4.00
	(C. pictus)	0.75
Coral butterflyfish	(C. plebius)	1.50
Latticed butterflyfish	(C. rafflesii)	3.00
	(C. strigangulus)	1.50
Redfin butterflyfish	(C. trifasciatus)	1.00
One-spot butterflyfish	(C. unimaculatus)	2.50
Vagabond butterfly	(C. vagabundus)	0.60
	(C. xanthocephalus)	2.50
Blue-green chromis	(Chromis caeruleus)	0.40
Red labrid (juvenile)	(Coris gaimard)	1.00
Red labrid (adult)	(C. gaimard)	3.00 - 5.00
White-tailed damselfish	(Dascyllus aruanus)	0.50
	(D. carneus)	0.30
Three-spot damselfish	(D. trimaculatus)	0.20
Porcupinefish	(Diodon hystrix)	2.50
Porcupinefish	(D. maculatus)	3.00
Snowflake moray eel	(Echidna nebulosa)	2.00
Zebra moray	(E. zebra)	4.00
	(Epinephelus boenak)	2.00
Blue and yellow reef-cod	(E. flavocaeruleus)	7.00
	(E. malabaricus)	2.00

Table 62 (continued)

Fish species		Unit Price (U.S.$)
Orange chromide	(Etroplus maculatus)	0.05
Silver chromide	(E. suratensis)	0.05
Long-nose butterflyfish	(Forcipiger flavissimus)	6.00
	(Gaterin albovittatus)	2.00
	(G. lineatum)	1.50
	(G. orientalis)	1.00
	(G. pictus)	1.50
Bar-eyed goby	(Glossogobius giuris)	0.06
	(Gomphosus coeruleus)	4.00
Longface	(G. varius)	1.75
Golden-striped grouper	(Grammistes sexlineatus)	2.00
Wrasse	(Halichoeres spp.)	1.50
	(Hemibalistes chrysoptera)	0.75
Pyramid butterflyfish	(Hemitaurichthys zoster)	6.00
Poor man's Moorish idol	(Heniochus acuminatus)	1.25
Poor man's Moorish idol	(H. permutatus)	3.00
	(H. singularis)	2.50
Sargassum fish	(Histrio histrio)	2.50
	(Holacanthus xanthurus)	2.00
Squirrel fish	(Holocentrus spp.)	1.75
	(Labroides dimidiatus)	0.40
Long-horned cowfish	(Lactoria cornuta)	3.00 - 4.00
	(Lutjanus dodecanthus)	2.00
Blue-striped snapper	(L. Kasmira)	1.25
Red emperor	(L. sebae)	6.00
	(Macalor niger)	7.00
Black-finned triggerfish	(Melichthys ringens)	1.25
	(Monocanthus pardelis)	1.25
	(M. tormentosus)	1.50
Moonfish	(Monodactylus argenteus)	0.10
	(Muraena tesselata)	4.00
Soldierfish	(Myripristis spp.)	1.00
Short-nosed unicorn tang	(Naso brevirostris)	2.00
Smooth-head unicorn tang	(N. lituratus)	3.00 - 5.00
Black triggerfish	(Odonus niger)	1.25
Spotted cube	(Ostracion cubicus)	1.75
	(O. gibbosus)	3.00 - 4.00
Spotted boxfish	(O. meleagris)	1.50 - 3.00
Long-nosed filefish	(Oxymonocanthus longirostris)	4.00
Blue-eyed panchax	(Panchax melastigma)	0.04
Blue surgeon	(Paracanthurus hepatus)	7.00
Orbiculate bat fish	(Platax oribicularis)	1.50
Long-finned bat fish	(P. teira)	2.50
Saddleback grouper	(Plectropomus maculatus)	2.00
Saltwater cat fish	(Plotosus anguillaris)	0.40
Blue king angelfish	(Pomacanthus annularis)	3.75
Emperor angelfish	(P. imperator)	8.00
Semicirole angelfish	(P. semicirculatus)	3.00
	(Pomacentrus melanochir)	0.20
Giant-spotted grouper	(Promicrops lanceolatus)	2.00
Blue-lined triggerfish	(Pseudobalistes fuscus)	7.50
Spotfin lion fish	(Pterois antennata)	2.00
Whitefin lion fish	(P. radiata)	6.00
Scorpion fish	(P. volitans)	1.00
Scat	(Scatophagus rubrifrons)	0.10 - 2.00
	(Scorpaenopsis roseus)	1.50
	(Stenopus hispidus)	0.75
	(Synansygia vericosa)	5.00
Pipefish	(Syngnathus spp.)	0.10

Table 62 (continued)

Fish species		Unit Price (U.S.$)
Lyretail wrasse	(Thalassoma lunare)	2.00
Green puffer	(Tetraodon fluviatilis)	0.05
Target perch	(Therapon jarbua)	0.06
Short-nosed tripod fish	(Triacanthus brevirostris)	0.07
Moorish idol	(Zanclus canescens)	1.00
Sailfin tang	(Zebrasoma veliferum)	5.00
	(Z. xanthurus)	3.00

APPENDIX III

Table 63

FEDERAL REPUBLIC OF GERMANY - Wholesale prices of wild-caught African freshwater fish (1975)

Fish species	Unit Price	
	D.M.	U.S.$[a]
1. LAKE TANGYANIKA		
Cyphotilapia frontosa	65.00	26.53
Callaochromis pleurospilus	7.00	2.85
Eretmodus cyanosticus	5.00	2.04
Julidochromis marlieri	4.50 - 24.00	1.83 - 9.79
J. ornatus	4.50 - 75.00	1.83 - 30.61
J. regani	22.00 - 70.00	8.98 - 28.57
J. transcriptus	4.50 - 75.00	1.83 - 30.61
Lamprologus compressiceps	15.00 - 24.00	6.12 - 9.79
L. callipterus	7.00	2.85
L. elongatus	7.00	2.85
L. furcifer	19.00 - 24.00	7.75 - 9.79
L. lemairei	10.00	4.08
L. modestus	10.00	4.08
L. petricola	8.00	3.26
L. pleuromaculatus	9.00	3.67
L. savori elongatus	4.00	1.63
L. savori savori	16.00	6.53
L. tetracanthus	10.00	4.08
Lamprichthys tanganicanus	26.00	10.61
Limnochromis auritus	5.50	2.24
L. [illegible]	5.50	2.24
L. nigripinnis	8.50	3.46
L. [illegible]	5.00	2.04
L. [illegible]	5.00	2.04
Lobochilotes labiatus	5.00	2.04
Simochromis babaulti	5.00	2.04
S. curvifrons	5.00	2.04
S. diagramma	5.00	2.04
Spathodus erythrodon	8.50	3.46
Symphorichromis multipunctatus	7.50	3.06
Tanganicodus irsacae	20.50	8.36
Telmatochromis temporalis	7.50	3.06
T. vittatus	9.50	3.87
Tropheus duboisi	60.00 - 70.00	24.48 - 28.57
T. moorei	14.00 - 24.00	5.71 - 9.79
Xenochromis boulengerii	12.50	5.10
Xenotilapia melanogenys	16.00	6.53
2. MALAWI		
Aulonocara sp.	10.00 - 45.00	4.08 - 18.36
Cyatochromis afra	4.20	1.71
C. obliquidens	4.20	1.71
Haplochromis euchilus	12.00	4.89
H. compressiceps	12.00	4.89
H. johnstoni	10.00	4.08
H. livingstoni	16.00 - 32.00	6.53 - 13.06
H. moorei	22.00 - 34.00	8.97 - 13.87
H. polystigma	9.00 - 12.00	3.67 - 4.89

a/ U.S.$ 1.00 = D.M. 2.45

Table 63 (continued)

Fish species	Unit Price	
	D.M.	U.S.$[a]
Haplochromis rostratus	8.00	3.26
H. venustus	13.00	5.30
Labeotropheus fuelleborni	5.00 - 26.50	2.04 - 10.81
L. trewavasae	9.00 - 35.00	3.67 - 14.28
L. pernostus	10.00	4.08
Labidochromis erwartii	10.00	4.08
L. mariniatus	7.00	2.85
L. caeruleus	8.50	3.46
L. velicans	4.00	1.63
Mastacembelus sp.	6.00	2.44
Melanochromis auratus	6.50	2.65
M. brevis	7.00	2.85
M. chipokae	11.00	4.48
M. lambrosus	18.00	7.34
M. melanopterus	6.00	2.44
M. simulans	4.50	1.83
M. vermivorus	4.50	1.83
Petrotilapia tridentiger	16.50	6.73
Pseudotropheus auratus	3.50 - 9.00	1.42 - 3.67
P. elegans	6.50	2.65
P. elongatus	4.50	1.83
P. fuscoides	8.00	3.26
P. gracilior	6.00 - 11.00	2.44 - 4.48
P. johanni	4.00 - 4.50	1.63 - 1.83
P. livingstoni	6.00 - 6.50	2.44 - 2.65
P. macrophthalmus	7.50 - 11.00	3.06 - 4.48
P. lucerna	12.50	5.10
P. ornatus	12.00	4.89
P. pindani	12.00	4.89
P. williamsi	6.50	2.65
P. zebra,	5.00 - 22.50	2.04 - 9.18
Synodontis nyasa	5.00	2.04

Table 64

THE NETHERLANDS - Wholesale prices of freshwater ornamental fish (1975)

Fish species		Unit Price (FL)[a]
Marbled headstander	(Abramites microcephalus)	8.75
Kuhli loach	(Acanthophthalmus kuhlii)	0.50
Long-finned African tetra	(Alestes longipinnis)	1.95
Striped headstander	(Anostomus anostomus)	7.95 - 9.95
Bloodfin	(Aphyocharax rubropinnis)	0.65
	(Aphyosemion walkeri)	2.50
Ortmann's dwarf cichlid	(Apistogramma ortmanni)	1.50
Ram	(A. ramirezi)	3.25
Lamp-eyes	(Aplocheilichthys macrophthalmus)	1.25
Blind cave tetra	(Anoptichthys jordani)	1.25
Red-eyed characin	(Arnoldichthys spilopterus)	4.75
Badis	(Badis badis)	0.95
Bala shark	(Balantiocheilus melanopterus)	19.75
	(Barbus conchonius)	0.50 - 2.95
	(B. nigrofasciatus)	0.70 - 2.50
Sumatra barb	(B. sumatranus)	0.85 - 1.25
Schubert's barb	(B. schuberti)	0.60
	(B. ticto)	1.35
Cherry barb	(B. titteya)	0.85
Siamese fighting fish	(Betta splendens)	0.65 - 1.60
Clown loach	(Botia macracantha)	3.00 - 4.95
Pearl danio	(Brachydanio frankei)	0.35
Zebra danio	(B. rerio)	0.35
Bumble bee fish	(Brachygobius xanthozona)	0.60
Marbled hatchet	(Gnathopicella strigata)	1.25
Firemouth	(Cichlasoma meeki)	0.85
Convict cichlid	(C. nigrofasciatum)	5.95
Thick-lipped gourami	(Colisa labiosa)	1.75 - up
Dwarf gourami	(C. lalia)	1.25
Aeneus catfish	(Corydoras aeneus)	1.25
Skunk catfish	(C. arcuatus)	1.25
Pygmy corydoras	(C. hastatus)	0.95
	(C. lydicia)	2.50
	(Etropiella debauwi)	1.95
Orange chromide	(Etroplus maculatus)	1.95
Flying fox	(Epalzeorhynchus kallopterus)	3.95
Silver hatchet	(Gasteropelecus levis)	1.95
Mormyrid	(Gnathonemus macrolepidotus)	7.50
Black tetra	(Gymnocorymbus ternetzi)	0.48
Chinese algae-eater	(Gyrinocheilus aymonieri)	0.50
Egyptian mouthbreeder	(Haplochromis multicolor)	0.85
Green kisser	(Helostoma temminckii)	1.00 - 1.50
Buenos Aires tetra	(Hemigrammus caudovittatus)	0.48
Glowlight tetra	(H. gracilis)	0.45
Head and tail light tetra	(H. ocellifer)	0.48
	(Hemirhamphodon pogonognathus)	2.75
Mosquito fish	(Heterandia formosa)	0.48
Cardinal tetra	(Cheirodon axelrodi)	0.75 - 1.10
Dawn tetra	(Hyphessobrycon eos)	1.25
Flame tetra	(H. flammeus)	0.48
Neon tetra	(H. innesi)	0.30 - 0.65
Bleeding heart tetra	(H. rubrostigma)	2.25
Lemon tetra	(H. pulchripinnis)	0.50
Red tetra	(H. rosaceus)	1.25
Serpa tetra	(H. serpae)	0.70 - 1.00

a/ U.S. 1.00 = FL 240 (May 1975)

Table 64 (continued)

Fish species		Unit Price (FL)[a/]
Black neon tetra	(Hyphessobrycon herbertaxelrodi)	0.65
American flagfish	(Jordanella floridae)	0.95
Glass catfish	(Kryptopterus bicirrhis)	1.50
Red tailed shark	(Labeo bicolor)	2.25 - 2.95
	(L. frenatus)	3.95
Guppy	(Lebistes reticulatus)	0.65 - 1.50
Frederici	(Leporinus frederici)	4.50
Banded leporinus	(L. fasciatum)	4.75
Whiptailed catfish	(Loricaria parva)	3.95
Paradise fish	(Macropodus opercularis)	0.85
Spotted spiny eel	(Mastocembelus maculatus)	5.95
Australian rainbow	(Melanotaenia nigrans)	0.75
Black phantom tetra	(Megalamphodus megalopterus)	2.50
Glass tetra	(Moenkhausia oligolepis)	0.65
Diamond tetra	(M. pittieri)	1.25
Sailfin molly	(Mollienesia latipinna)	1.25
Sphenops	(M. sphenops)	2.95
Sailfin molly	(M. velifera)	1.25 - 3.75
Mono	(Monodactylus argenteus)	3.95
Beckford's pencil fish	(Nannostomus beckfordi)	0.60
Dwarf pencil fish	(N. marginatus)	0.70
Harrison's pencil fish	(N. harrisoni)	1.75
Three-lined pencil fish	(N. trifasciatus)	1.75
Emperor tetra	(Nematobrycon palmeri)	2.75
Guenther's notobranch	(Notobranchius guentheri)	1.25
African tetra	(Nannaethiops unitaeniatus)	1.25
	(Ophiocara porocephala)	1.25
Pimelodella	(Pimelodella gracilis)	2.25
Kribensis	(Pelmatochromis kribensis)	1.65 - 2.50
	(Peditella georgiae)	2.00
Pencil fish	(Poecilobrycon eques)	1.25
Glass bloodfin	(Prionobrama filigera)	1.95
Pristella	(Pristella riddlei)	0.50
	(Pseudotropheus auratus)	6.95
	(P. spengleri)	6.95
	(P. tropheops)	6.95
	(P. williamsi)	8.95
Angel fish	(Pterophyllum scalare)	0.55 - 11.00
Greater scissortail	(Rasbora caudimaculata)	8.50
Two-spot rasbora	(R. elegans)	1.25
Rasbora	(R. heteromorpha)	0.65
Dwarf rasbora	(R. maculata)	0.65
Red-line rasbora	(R. pauciperforata)	0.60
Three-lined rasbora	(R. trilineata)	0.50
Scat	(Scatophagus argus)	2.50 - 3.50
Chocolate gourami	(Sphaerichthys osphromenoides)	2.25
Discus	(Symphysodon discus)	7.50 - 39.50
Upside-down catfish	(Synodontis nigroventris)	2.25
Celebes rainbow fish	(Telmatherina ladigesi)	2.95
Figure-eight puffer	(Tetraodon palembangensis)	1.50
White cloud mountain minnow	(Tanichthys albonubes)	0.30
Penguin	(Thayeria obliqua)	0.70
	(Tilapia natalensis)	1.95
	(Trichogaster cosbyi)	0.60
Pearl gourami	(T. leeri)	0.75
Blue gourami	(T. trichopterus)	0.60 - 1.75
Moonbeam gourami	(T. microlepis)	1.25
African knife fish	(Xenomystus nigri)	2.50
Swordtail	(Xiphophorus helleri)	0.60 - 1.25

Table 65

THE NETHERLANDS - Wholesale prices of saltwater fish (1975)

Fish species	Unit Price (FL)
Abudefduf spp.	5.00
Acanthurus spp.	29.00
Amphiprion alkallopiscs	8.00
A. ephippium	6.95
A. frenatus	7.50
A. melanopus	8.00
A. percula	3.95
A. polymnus	10.00
A. sebae	8.00
A. xanthurus	8.50
Anthias squamipinnis	13.95
Apogon spp.	8.00
Balistes spp.	19.50
Bodianus axillaris	21.00
Bolbometapon sp.	38.00
Centropyge spp.	20.00
Chelmon rostratus	20.00
Chromileptes altivelis	25.00
Chromis caeruleus	5.00
Chaetodon spp.	17.00
Coris spp.	12.50
Dascyllus spp.	4.50
Dendrochirus spp.	19.50
Gomphosus sp.	18.75
Heniochus acuminatus	22.50
Hippocampus kuda	6.00
Labroides dimidiatus	10.00
Melichthys ringens	38.00
Mulloidichthys sp.	14.00
Naso lituratus	38.00
Plectorhynchus sp.	19.50
Pomacanthus annularis	45.00
Pomacanthus sp.	68.00
Premnas biaculeatus	11.00
Pseudocheilinus hexataenia	18.00
Pterois volitans	20.00
P. radiata	20.00
Thalassoma lunare	17.00
Zebrasoma scopas	19.00

Table 66

MIAMI (U.S.A.) - Wholesale prices of ornamental fish (1974)

Supplier No.1

Fish species	Unit Price in U.S.$/Number					
	1	12	25	50	100	125
Apistogrammas	-	0.24	0.22	0.20	0.18	-
Convict cichlids	-	0.24	0.22	0.20	0.18	-
Jack Dempseys	-	0.24	0.22	0.20	0.18	-
Egyptian mouthbreeders	-	0.24	0.22	0.20	0.18	-
Cichlasoma meeki	-	0.22	0.20	0.18	0.16	-
Portalegrensis	-	0.24	0.22	0.20	0.18	-
Ramirezis	-	0.32	0.28	0.26	0.24	-
Jewel cichlids	-	0.34	0.30	0.28	0.26	-
Cichlasoma festivum	-	0.36	0.32	0.30	0.28	-
C. severum	-	0.36	0.32	0.30	0.28	-
Pike cichlids	-	0.80	0.75	-	-	-
Kribensis	-	0.54	0.50	0.48	0.46	-
Golden rams	-	0.52	0.48	0.46	0.44	-
Orange chromides	-	0.48	0.44	0.42	0.40	-
Oscars	-	0.38	0.34	0.32	0.30	-
Geophagus jurupari	-	1.00	0.90	-	-	-
Silver angels (wild)	-	1.00	-	-	-	-
Pseudotropheus auratus	1.20	1.00	-	-	-	-
Haplochromis burtoni	0.50	0.40	-	-	-	-
H. polystigma	2.50	2.00	-	-	-	-
Labeotropheus trewavasae	3.00	2.50	-	-	-	-
L. fuelleborni	3.00	2.50	-	-	-	-
Petrotilapia tridentiger	1.20	1.00	-	-	-	-
Melanochromis vermivorus	3.00	2.50	-	-	-	-
Pseudotropheus dingani	8.00	-	-	-	-	-
P. johanni	9.00	-	-	-	-	-
P. sistoni	12.00	-	-	-	-	-
Corydoras hastatus	-	0.16	0.14	0.12	0.10	-
C. elegans	-	0.26	0.24	0.22	0.20	-
C. melanistius	-	0.26	0.24	0.22	0.20	-
C. punctatus	-	0.28	0.26	0.24	0.22	-
C. arcuatus	-	0.30	0.28	0.26	0.24	-
C. julii	-	0.30	0.28	0.26	0.24	-
C. aeneus	-	0.32	0.30	0.28	0.26	-
C. metae	-	0.32	0.30	0.28	0.26	-
Otocinclus	-	0.18	0.16	0.14	0.12	-
Porthole catfish	-	0.24	0.22	0.20	0.18	-
Spinossisimus cats	-	0.22	0.20	0.18	0.16	-
Banjo cats	-	0.40	0.36	0.34	0.32	-
Loricarias	-	0.40	0.36	0.34	0.32	-
Phantom glass catfish	-	0.54	0.50	0.48	0.46	-
Plecostomus	-	0.50	0.46	0.44	0.42	-
Pimelodella angelicus	-	1.00	0.95	0.90	-	-
P. gracilis	-	0.32	0.28	0.26	0.24	-
Shovelnose catfish	-	2.00	-	-	-	-
Cardinal tetras	-	0.20	0.18	0.17	0.17	-
Neon tetras	-	0.14	0.13	0.13	0.11	-
Black tetras	-	0.22	0.20	0.19	0.18	-
Black neon tetras	-	0.30	0.28	0.27	0.26	-
Bleeding heart tetras	-	0.26	0.24	0.23	0.22	-
Blind cave tetras	-	0.28	0.26	0.25	0.24	-

Table 66 (continued)

Fish species	Unit Price in U.S.$/Number					
	1	12	25	50	100	125
Bloodfin tetras	-	0.28	0.26	0.25	0.24	-
Buenos Aires tetras	-	0.22	0.20	0.19	0.18	-
Glow light tetras	-	0.24	0.22	0.21	0.20	-
Gold tetras	-	0.20	0.18	0.17	0.16	-
Headstanders	-	0.46	0.42	0.40	0.38	-
Marbled hatchets	-	0.24	0.22	0.21	0.20	-
Black-winged hatchets	-	0.22	0.20	0.19	0.18	-
Silver hatchets	-	0.26	0.24	0.23	0.22	-
Head and tail light tetras	-	0.20	0.18	0.17	0.16	-
Lemon tetras	-	0.26	0.24	0.23	0.22	-
Pencilfish	-	0.22	0.20	0.19	0.18	-
Robertis tetras	-	0.20	0.18	0.17	0.16	-
Pristellas	-	0.18	0.16	0.15	0.14	-
Serpa tetras	-	0.26	0.24	0.23	0.22	-
Flame tetras	-	0.24	0.22	0.21	0.20	-
Silver tip tetras	-	0.26	0.24	0.23	0.22	-
Penguins	-	0.26	0.24	0.23	0.22	-
Kissing gouramis	-	0.28	0.26	0.24	0.22	-
Blue gouramis	-	0.24	0.22	0.20	0.18	-
Leeri gouramis	-	0.42	0.38	0.36	0.34	-
Dwarf gouramis	-	0.38	0.34	0.32	0.30	-
Honey gouramis	-	0.44	0.40	0.38	0.36	-
Golden gouramis	-	0.48	0.44	0.42	0.40	-
Cherry barbs	-	0.28	0.26	0.24	0.22	-
Rosy barbs	-	0.20	0.18	0.16	0.14	-
Gold barbs	-	0.28	0.26	0.24	0.22	-
Sumatra barbs	-	0.24	0.22	0.20	0.18	-
Oliogolepis	-	0.30	0.28	0.26	0.24	-
Clown barbs	-	0.42	0.38	0.36	0.34	-
Tinfoil barbs	-	0.44	0.40	0.38	0.36	-
Tee barbs	-	0.42	0.38	0.36	0.34	-
Ruby barbs	-	0.34	0.30	0.28	0.26	-
Giant danios	-	0.24	0.22	0.20	0.18	-
Pearl danios	-	-	0.14	0.12	0.11	-
Leopard danios	-	-	0.18	0.16	0.15	-
Zebra danios	-	-	0.12	0.11	0.10	-
Scissortail rasboras	-	0.26	0.24	0.22	0.20	-
Rasboras	-	0.26	0.24	0.22	0.20	-
Algae eaters	-	0.24	0.22	0.20	0.18	-
Rainbow sharks	-	0.82	0.78	0.74	-	-
Redfin sharks	-	0.44	0.40	0.38	0.36	-
Bumble bees	-	0.24	0.22	0.20	0.18	-
Kuhlii loaches	-	0.24	0.22	0.20	0.18	-
Longnose loaches	-	0.42	0.38	0.36	0.34	-
Spiny eels	-	0.70	0.66	0.62	-	-
Black sharks	-	0.50	0.46	0.44	0.42	-
Fire eels	-	8.00	-	-	-	-
Leopard puffers	-	0.70	0.66	0.62	-	-
Green scats	-	1.25	-	-	-	-
White cloud minnows	-	0.18	0.16	0.14	0.12	-
Flounders	-	0.24	0.22	0.20	0.18	-
Glass fish	-	0.34	0.30	0.28	0.26	-

Table 66 (continued)

Fish species	Unit Price in U.S.$/Number					
	1	12	25	50	100	125
Metynnis	-	0.56	0.54	0.52	0.50	-
Clear knife fish	-	0.65	0.60	-	-	-
Black banded sunfish	-	0.65	0.60	-	-	-
Arowanas	-	3.00	2.75	-	-	-
Chalceus (red tail)	-	1.20	1.10	-	-	-
Leporinus frederici	-	0.55	0.50	-	-	-
L. fasciatus	-	0.85	0.80	-	-	-
Ghost knife fish	-	4.50	-	-	-	-
Anostomus anostomus	-	1.50	-	-	-	-

Table 67

MIAMI (U.S.A) - Jobbers price list of ornamental fish (1975)

Supplier No.1

Fish species	Unit Price (U.S.$)
Apistogrammas	0.16
Convict cichlids	0.16
Jack Dempseys	0.16
Cichlasoma meeki	0.14
Portalegrensis	0.14
Jewel cichlids	0.24 - 0.44
Oscars	0.28
Egyptian mouthbreeders	0.16
Ramirezis	0.22
Orange chromides	0.40
Cichlasoma festivum	0.26
Pseudotropheus auratus	0.70 (0.60 for x 100 lots)
Petrotilapia tridentiger	0.75 (0.65 for x 100 lots)
Haplochromis burtoni	0.25 - 0.50
H. polystigma	2.00
Silver angels (wild)	1.00
Corydoras hastatus	0.10
C. elegans	0.17
C. punctatus	0.19
C. julii	0.20
Otocinclus	0.11
Porthole catfish	0.20
Spinossisimus catfish	0.18
Loricarias	0.30
Pimelodella gracilis	0.22
Banjo catfish	0.30
Plecostomus	0.42
Cardinal tetras	0.15 (0.13 for x 1 000 lots)
Neon tetras	0.10 (0.08 for x 1 000 lots)
Black tetras	0.17
Black neon tetras	0.24
Bleeding heart tetras	0.18
Blind cave tetras	0.22

Table 67 (continued)

Fish species	Unit Price (U.S.$)
Bloodfin tetras	0.22
Buenos Aires tetras	0.16
Gold tetras	0.16
Headstanders	0.38
Head and tail light tetras	0.16
Lemon tetras	0.20
Pencilfish	0.18
Serpae tetras	0.18
Robertis tetras	0.16
Silver tip tetras	0.20
Flame tetras	0.18
Marbled hatchets	0.18
Black-winged hatchets	0.16
Kissing gouramis	0.20
Blue gouramis	0.18
Leeri gouramis	0.32
Cherry barbs	0.22
Rosy barbs	0.12
Gold barbs	0.22
Sumatra barbs	0.18
Oliogolepis	0.22
Tee barbs	0.32
Clown barbs	0.32
Ruby barbs	0.32
Giant danios	0.18
Pearl danios	0.10 (0.09 for x 500 lots)
Leopard danios	0.14
Zebra danios	0.09 (0.08 for x 500 lots)
Scissortail rasboras	0.19
Rasboras	0.19
Algae eaters	0.14
Redtail sharks	0.72
Kuhlii loaches	0.18
Bumble bees	0.18
Long-nose loaches	0.34
Leopard puffers	0.60

Table 68

MIAMI (U.S.A.) - Wholesale prices of saltwater ornamental fish (1974)

Supplier No.1

Fish species	Unit Price in U.S.$/Number	
	1	6
Blue tang	3.50 - 4.25	3.25 - 4.00
Yellow tang	2.80 - 3.50	2.60 - 3.25
Surgeon	1.50 - 2.00	1.30 - 1.70
Blue head wrasse	2.00	1.80
Rainbow wrasse	2.00	1.80
Yellowhead wrasse	2.00	1.80
Pudding wife (clown wrasse)	2.75	2.25
Slippery dick	1.50	1.30
Neon wrasse	3.25	3.00
Spanish hog fish	4.00	3.75
Cuban hog fish	10.00 - 15.00	-
Spotted drum	7.00	6.50
Jack knife	7.00	6.50
Queen triggerfish	4.25 - 6.00	4.00
Black trigger	7.00	-
Cardinal fish	1.60	1.40
Big eye	5.00	4.50
Look down	3.00	2.75
Striped squirrel fish	3.25	3.00
Pork fish	2.25	2.00
Black bar soldier	3.00	2.75
Blue reef fish	3.00	2.75
Painted parrot fish	4.00	3.75
Hi hat	1.60	1.40
Rock hind	4.50	4.25
Soap fish	3.00	2.75
Black angelfish	4.75 - 6.50	4.50 - 6.50
French angelfish	4.75 - 6.50	4.50 - 6.50
Blue angelfish	4.25 - 6.50	4.00 - 6.50
Queen angelfish	4.25 - 6.50	4.00 - 6.50
Rock beauty	3.75 - 4.50	4.00 - 4.25
Royal gramma	3.75	3.50
Harlequin fish	3.25	3.00
Tobacco fish	5.00 - 6.50	4.75
Chalk basslet	5.25	5.00
Creale basslet	5.25 - 7.00	5.00
Black cap basslet	12.00	-
Molly Miller blenny	1.75	1.50
Red lip blenny	2.00	1.80
Four-eye butterflyfish	2.50 - 4.50	2.30 - 2.80
Banded butterflyfish	3.60	3.40
Painted butterflyfish	3.60	3.40
Spot fin butterflyfish	3.60	3.40
Long-nosed butterflyfish	8.00	-
Flame goby	2.00	1.75
Neon goby	1.75	1.50
Sharp-nose goby	2.25	2.00
Blue hamlet	3.50	3.25
Butter hamlet	3.50	3.25
Banded hamlet	3.50	3.25
Red-spotted hawk	3.50	3.25
Black hamlet	4.25	4.00
Shy hamlet (indigo hamlet)	9.00	-

Table 68 (continued)

Fish species	Unit Price in U.S.$/Number	
	1	6
Beau Gregory	1.10	1.00
Brown and white damselfish	1.25	1.10
Honey damselfish	1.25	1.10
Sergeant-major	1.00	0.90
Yellow damselfish	2.50	2.25
Jewel damselfish	3.00	2.75
Deep water damselfish	3.00	2.75
Dusky jawfish	3.00	2.80
Pearly jawfish	3.60	3.40
Chain moray eel	4.00	3.75
Gold spotted moray eel	4.50	4.25
Yellowtail moray eel	6.00	5.50
Viper moray eel	7.00	6.50
ATLANTIC BAY VARIETIES:		
Spiny box fish	0.90	0.80
Bean fish	0.90	0.80
Cowfish	0.90	0.80
Pipefish	0.30	0.25
Dwarf seahorses	0.25	0.20
Puffers	0.90	0.80
Flounders	1.50	1.25
Trunk fish	0.90	0.80
Porcupine fish	1.50	1.25
Sargassum fish	2.50	2.25
Scorpion fish	2.50	2.25
Filefish	0.80	0.70
Florida bat fish	1.75	1.50
Spade fish	2.50	2.25
Black grouper	2.75	2.50
Red hind (grouper)	3.25	3.00
Sea robin	2.50	2.25
Hog snapper	1.75	1.50
Bay parrot	1.50	1.25

Table 69

MIAMI (U.S.A) - Jobbers price list of saltwater ornamental fish (1975)

Suppler No.1

Fish species	Unit Price (U.S.$)
Blue tang	3.00 - 3.75
Yellow tang	2.50 - 3.25
Surgeon	1.25 - 1.75
Blue head wrasse	1.60
Rainbow wrasse	1.60
Yellowhead wrasse	1.60
Pudding wife (clown wrasse)	2.00
Neon wrasse	2.50
Spanish hog fish	3.50
Cuban hog fish	10.00 - 15.00
Spotted drum	6.00
Jack knife	6.00
Queen triggerfish	4.00
Black trigger	6.50
Cardinal fish	1.20
Big eye	4.00
Look down	2.50
Striped squirrel fish	3.00
Pork fish	1.60
Black bar soldier	2.50
Blue reef fish	2.50
Painted parrot fish	3.50
Hi hat	1.20
Rock hind	3.75
Soap fish	2.25
Black angelfish	4.25 - 6.50
French angelfish	4.25 - 6.50
Blue angelfish	4.00 - 6.50
Queen angelfish	4.00 - 6.50
Rook beauty	3.25 - 3.75
Royal gramma	3.25
Harlequin fish	2.75
Tobacco fish	4.50 - 6.00
Chalk basslet	4.75
Creole basslet	4.75
Molly Miller blenny	1.25
Red lip blenny	1.60
Four-eye butterflyfish	2.25 - 4.25
Banded butterflyfish	3.25
Painted butterflyfish	3.25
Spot fin butterflyfish	3.25
Long-nosed butterflyfish	7.50
Flame goby	1.50
Neon goby	1.30
Sharp-nose goby	2.00
Blue hamlet	3.00
Butter hamlet	3.00
Red spotted hawk	3.00
Black hamlet	4.00
Shy hamlet (indigo hamlet)	8.00
Beau Gregory	0.90
Brown and white damselfish	1.00
Honey damselfish	1.00
Sergeant-major	0.90

Table 69 (continued)

Fish species	Unit Price (U.S.$)
Yellow damselfish	2.00
Jewel damselfish	2.50
Deep water damselfish	2.50
Dusky jawfish	2.60
Pearly jawfish	3.25
Chain moray eel	3.50
Gold spotted moray eel	4.00
Yellowtail moray eel	5.00
Viper moray eel	6.00
ATLANTIC BAY VARIETIES:	
Spiny box fish	0.70
Bean fish	0.70
Cowfish	0.70
Pipefish	0.20
Dwarf seahorses	0.18 (0.16 for x 100 lots)
Flounders	1.00
Trunk fish	0.80
Porcupine fish	1.00
Sargassum fish	2.00
Scorpion fish	2.00
Filefish	0.70
Florida bat fish	1.25
Spade fish	2.00
Black grouper	2.00
Red hind (grouper)	2.50
Sea robin	2.00
Hog snapper	4.00
Bay parrot	1.00

Table 70

MIAMI (U.S.A.) - Wholesale prices of ornamental fish (1974)

Supplier No.2

Fish species		Unit Price (U.S.$)
Ram	(Apistogramma ramirezi)	1.00
Dwarf cichlid	(Apistogramma sp.)	0.25
Oscar (wild)	(Astronotus ocellatus)	0.35
Jack Dempsey	(Cichlasoma biocellatum)	0.25
Flag cichlid	(C. festivum)	0.30
Firemouth	(C. meeki)	0.20
Convict cichlid	(C. severum)	0.30
Angel fish (wild)	(Pterophyllum scalare)	0.20 - 0.65
All species	(Corydoras spp.)	0.25
Banjo catfish	(Bunocephalus sp.)	0.30
Plecostomus	(Hypostomus plecostomus)	0.60
Glass catfish	(Kryptopterus bicirrhis)	0.60
Farlowella	(Farlowella sp.)	0.60
Whiptailed catfish	(Loricaria parva)	0.35
	(Otocinclus sp.)	0.18
	(Pimelodella angelicus)	1.25
Cardinal tetra	(Cheirodon axelrodi)	0.16 - 0.30
Bloodfin	(Aphyocharax rubripinnis)	0.25
Striped headstander	(Anostomus anostomus)	1.50
Blind cave tetra	(Anoptichthys jordani)	0.25
Marbled headstander	(Abramites microcephalus)	0.90
Marbled hatchet	(Carnegiella strigata)	0.20
Headstander	(Chilodus punctatus)	0.50
Gold tetra	(Hemigrammus armstrongi)	0.20
Glow light tetra	(H. gracilis)	0.20
Head and tail light tetra	(H. ocellifer)	0.22
Rummy nose tetra	(H. rhodostomus)	0.25
Silver tip tetra	(H. nanus)	0.25
Black tetra	(Gymnocorymbus ternetzi)	0.20
Silver hatchet	(Gasteropelecus sternicla)	0.28
Neon tetra	(Hyphessobrycon innesi)	0.12 - 0.30
Serpa tetra	(H. serpae)	0.25
Rosaceus tetra	(H. rosaceus)	0.20
Black neon tetra	(H. herbertaxelrodi)	0.22
Flame tetra	(H. flamneus)	0.22
Lemon tetra	(H. pulchripinnis)	0.25
Bleeding heart tetra	(H. rubrostigma)	0.25
Blue tetra	(Microbrycon fredcochui)	0.25
Banded leporinus	(Leporinus fasciatus)	1.00
Leaf fish	(Monocirrhus polyacanthus)	1.00
Silver dollars	(Metynnis sp.)	0.65 up
Black phantom tetra	(Megalamphodus megalopterus)	0.32
Penguin	(Thayeria obliqua)	0.25
Butterfly fish	(Periophthalmus papilio)	3.00
Black ghost	(Sternarchus albifrons)	5.50
	(Gymnotus sp.)	0.75
Elephant nose	(Gnathonemus petersi)	5.00
Congo tetra	(Micralestes interruptus)	2.50
Golden lyretail	(Aphyosemion australe)	0.75
Spiny eel	(Mastocembelus maculatus)	0.75
Dwarf loach	(Botia sidthimunki)	0.40

Table 70 (continued)

Fish species		Unit Price (U.S.$)
Clownloach	(Botia macracantha)	2.00
Kuhlii loach	(Acanthophthalmus kuhlii)	0.28
Red tail shark	(Labeo bicolor)	1.50
Red fin shark	(L. erythrurus)	0.45
Bumble bee	(Brachygobius sp.)	0.25
Siamese tiger fish	(Datnioides microlepis)	2.25
Archer fish	(Toxotes jaculator)	1.25 - 2.00
Scat	(Scatophagus sp.)	2.00
Glass fish	(Ambassis lala)	0.25
Australian rainbow fish	(Melanotaenia sp.)	0.25

Table 71

MIAMI (U.S.A.) - Wholesale prices of ornamental fish (1973)

Supplier No.3

Fish species		Unit Price (U.S.$)
Aeneus catfish	(Corydoras aeneus)	0.20
Agassiz's catfish	(C. agassizi)	0.20
Skunk catfish	(C. arcuatus)	0.20
	(C. decker)	0.18
Elegant catfish	(C. elegans)	0.16
Pygmy corydoras	(C. hastatus)	0.10
Leopard catfish	(C. julii)	0.20
Bandit catfish	(C. metae)	0.22
	(C. melanistius)	0.16
Spotted catfish	(C. punctatus)	0.18
	(C. rabauti)	0.20
Sailfin tetra	(Crenuchus spiluris)	0.18
Short-bodied catfish	(Brochis coeruleus)	0.20
Spiny catfish	(Acanthodoras spinossisimus)	0.20
Stripe-tailed catfish	(Dianema urostriata)	0.20
Banjo catfish	(Bunocephalus coracoideus)	0.20
Farlowella	(Farlowella sp.)	0.50
Plecostomus	(Hypostomus plecostomus)	0.35 - 0.45
Whiptailed catfish	(Loricaria parva)	0.20
	(Otocinclus sp.)	0.10
	(Pimelodella sp.)	0.20
Spotted pimelodus	(Pimelodus clarias)	1.00
Shovelnose catfish	(Sorubim lima)	1.50
Cardinal tetra	(Cheirodon axelrodi)	0.12 - 0.15
Black tetra	(Gymnocorymbus thayeri)	0.16
Blind cave tetra	(Anoptichthys jordani)	0.25
Marbled headstander	(Abramites microcephalus)	0.70
Striped headstander	(Anostomus anostomus)	0.90
Black-winged hatchet	(Carnegiella marthae)	0.12 - 0.22
Marbled hatchet	(C. strigata)	0.16
Splash tetra	(Copeina arnoldi)	0.15
Red-spotted copeina	(C. guttata)	0.15
Glowlight tetra	(Hemigrammus gracilis)	0.12
Gold tetra	(H. armstrongi)	0.12

Table 71 (continued)

Fish species		Unit Price (U.S.$)
Rosy tetra	(Hemigrammus rosaceus)	0.14
Silver tipped tetra	(H. nanus)	0.18
Buenos Aires tetra	(H. caudovittatus)	0.18
Head and tail light tetra	(H. ocellifer)	0.12
Rummy nose tetra	(H. rhodostomus)	0.22
Neon tetra	(Hyphessobrycon innesi)	0.07 - 0.25
Black neon tetra	(H. herbertaxelrodi)	0.15
Flame tetra	(H. flammeus)	0.18
Black-lined tetra	(H. scholzei)	0.16
Yellow tetra	(H. pulchripinnis)	0.22
Serpa tetra	(H. serpae)	0.24
Loreto tetra	(H. peruvianus)	0.14
Bleeding heart tetra	(H. rubrostigma)	0.18
Emperor tetra	(Nematobrycon palmeri)	0.45
Blue tetra	(Microbrycon fredcochui)	0.16
Three-lined pencilfish	(Nannostomus trifasciatus)	0.15
Dwarf pencil fish	(N. marginatus)	0.15
One-lined pencil fish	(Poecilobrycon unifasciatus)	0.15
	(Moenkhausia sp.)	0.18
Black phantom tetra	(Megalamphodus megalopterus)	0.45
Banded leporinus	(Leporinus fasciatus)	0.70
Frederici	(L. frederici)	0.35
Half-lined hemiodus	(Hemiodus semitaeniatus)	0.35
Leaf fish	(Monocirrhus polyacanthus)	0.70
Penguin	(Thayeria obliqua)	0.20
Buck-toothed tetra	(Exodon paradoxus)	0.85
Prochilodus	(Prochilodus insignis)	0.50 up
Silver dollar	(Metynnis spp.)	0.25 - 1.25 up
Pink-tailed chalceus	(Chalceus macrolepidotus)	1.50
Needle fish	(Ctenolucius hujeta)	1.75 up
	(Pimelodella angelicus)	1.00
Spotted pimelodus	(Pimelodus clarias)	0.22
Black ghost	(Sternarchus albifrons)	4.50 up
Lung fish	(Lepidosiren paradoxum)	10.00 up
Arawana	(Osteoglossum bicirrhosum)	1.50 - 2.50 up
Arapaima	(Arapaima gigas)	4.00 up
Four-eyed fish	(Anableps anableps)	1.25 up
Pristella	(Pristella riddlei)	0.15
Electric eel	(Electrophorus electricus)	3.00 up
Pike top minnow	(Belonesox sp.)	0.85
Giant danio	(Danio malabaricus)	0.20
Pearl danio	(Brachydanio albolineatus)	0.09
Leopard danio	(B. kerri)	0.10
Zebra danio	(B. rerio)	0.08
Clown barb	(Barbus everetti)	0.45
Tee-barb	(B. lateristriga)	0.45
Tin foil barb	(B. schwanenfeldi)	0.25 up
Cherry barb	(B. titteya)	0.22
Gold barb	(Puntius sachsi)	0.22
Black spot barb	(P. filamentosus)	0.22
Checker barb	(Barbus oligolepis)	0.22
Firemouth	(Cichlasoma meeki)	0.14
Oscar (juvenile)	(Astronotus ocellatus)	0.24
Flag cichlid	(Cichlasoma festivum)	0.20
Convict cichlid	(C. severum)	0.30 - 3.50 up

Table 71 (continued)

Fish species		Unit Price (U.S.$)
Ram	(Apistogramma ramirezi)	0.22
Keyhole cichlid	(Aequidens maronii)	0.50
Black acara	(A. portalgegrensis)	0.18
Jack Dempsey	(Cichlasoma biocellatum)	0.22
Convict cichlid	(C. nigrofasciatum)	0.22
Pike cichlid	(Crenicichla lepidota)	1.50 up
Angel fish (wild)	(Pterophyllum scalare)	0.16 - 2.00
Discus fish	(Symphysodon discus)	1.90 - 18.00 up
Jewel cichlid	(Hemichromis bimaculatus)	0.20
Orange chromide	(Etroplus maculatus)	0.40
	(Haplochromis polystigma)	2.00 up
	(Labeotropheus fulleborni)	2.00 up
	(Pseudotropheus auratus)	2.00 up
	(P. tropheops)	2.00 up
Red tailed shark	(Labeo bicolor)	0.28
Black shark	(Morulius chrysophekadion)	0.35
Clown loach	(Botia macracantha)	0.50 up
Glass catfish	(Kryptopterus bicirrhis)	0.40
Archer fish	(Toxotes jaculator)	0.75 up
Scat	(Scatophagus argus)	0.75 up
Mono	(Monodactylus argenteus)	0.75 up
Puffer	(Tetraodon cutcutia)	0.50
Figure-eight puffer	(T. palembangensis)	0.80
	(Channa asiatica)	0.75 up
Rasbora	(Rasbora heteromorpha)	0.18
Scissortail	(R. trilineata)	0.18
Chinese algae-eater	(Cyrinocheilus aymonieri)	0.15
Siamese tiger fish	(Datnioides microlepis)	0.50 up
Bala shark	(Balantiocheilus melanopterus)	5.00

Table 72

U.K. - Representative retail prices of selected ornamental fish (1973)

Fish species		Unit price (£.Stg.)[a/]
1. SALTWATER SPECIES		
Queen angelfish	(Holacanthus ciliaris)	6.50 up
French angelfish	(Pomacanthus paru)	6.50 up
Rock beauty	(Holacanthus tricolor)	5.50 up
Damselfish	(Pomacantrus spp.)	0.625 up
Blue tang	(Acanthurus coeruleus)	4.50 up
Two-coloured angelfish	(Centropyge bicolor)	7.50
Sailfin tang	(Zebrasoma veliferum)	9.00
2. FRESHWATER SPECIES		
Black ghosts (12 inches in size)		10.00
Oscar (8 inches in size)	(Astronotus ocellatus)	5.00
Eartheater (6 inches in size)	(Geophagus jurupari)	1.75
	(Cichlasoma severum) (6 inches in size)	1.75
Striped anostomus	(Anostomus anostomus)	1.25 - 1.50
Striped headstander	(Chilodus punctatus)	0.85
Black neon tetra	(Hyphersobrycon herbertaxelrodi)	0.225
Rosy tetra	(H. rosaceus)	0.20
Flame tetra	(Hemigrammus flammeus)	0.125
Glowlight tetra	(H. gracilis)	0.15
Lemon tetra	(Hyphessobrycon pulchripinnis)	0.20
Serpa tetra	(H. serpae)	0.20
Loreto tetra	(H. peruvianus)	0.15
	(Corydoras aeneus)	0.45
	(Otocinclus vittatus)	0.375
Sucker catfish	(Hypostomus plecostomus)	0.75 - 1.00

a/ U.S.$ 1.00 = £.Stg. 0.425 (May 1975)

APPENDIX IV

Table 73

COLOMBIA - Value of fisheries exports (1968-71)

Item	F.O.B. value in U.S.$			
	1968	1969	1970	1971[a]
Prawns	2 534 000	3 769 000	4 520 000	2 665 000
Oysters	308 000	335 000	24 000	-
Lobsters	110 000	134 000	209 000	92 000
Fish	-	-	4 000	-
Ornamental fish	171 000	347 000	181 000	66 000
Total	3 123 000	4 585 000	4 938 000	2 823 000

a/ Data for period January-June only

Source of data: Bermúdez, A., D. (Thesis, 1974)

Table 74

COLOMBIA - Value of ornamental fish with regard to total fisheries (1969-70)

Item	(Col.Ps.)[a]	
	1969	1970
Fish, molluscs and crustaceans	463 800 000	541 700 000
Ornamental fish	4 800 000	5 900 000
Total	468 600 000	547 600 000

a/ U.S.$ 1.00 = Col.Ps. 30.20 (May 1975)

Source of data: Bermúdez, A., D. (Thesis, 1974)

Table 75

COLOMBIA - Value of ornamental fish production (1969-70)

Species	Unit price (Col.Ps.)	1969		1970	
		Number caught	Total value[a] (Col.Ps.)	Number caught	Total value[a] (Col.Ps.)
Corydoras	0.80	1 200 000	960 000	1 390 900	1 112 000
Cichlids	2.00	382 000	611 200	424 500	636 750
Neon tetras	0.60	1 432 000	859 000	1 868 000	1 214 200
Bunocephalus	1.60	96 700	154 700	81 600	146 800
Otocinclus sp.	0.80	82 600	66 080	99 800	79 840
Cardinal tetras	0.90	410 000	369 000	570 000	513 000
Plecostomus	1.60	630 100	750 000	454 000	749 100
Pencil fish	0.60	230 000	138 000	190 000	114 000
Other species	0.60	2 710 000	948 500	3 400 200	1 360 000
Total		7 173 400	4 856 480	8 479 000	5 925 690

a/ Value of Col.Ps. at fisherman level

Source of data: Bermúdez, A., D. (Thesis, 1974)

Table 76

COLOMBIA - Destination of ornamental fish produced (1970)

Item	Number of fish	Percent
Domestic market	5 105 784	60.21
Export	3 373 662	37.79
Total	8 479 446	100.00

Source of data: Statistical Services of INDERENA

Table 77

COLOMBIA - Registered movement of ornamental fish (1970)

Species		Number of fish
Corredoras	(*Corydoras* spp.)	1 390 932
Cichlids		424 568
Tetras	(*Hyphessobrycon* spp., *Hemigrammus* spp.)	1 868 060
Catfish (several genera and species)		81 650
	Otocinclus spp.	99 850
Cabeza roja (?)		49 550
Estrigata	(*Carnegiella strigata*)	251 580
Cardinales	(*Cheirodon axelrodi*)	569 503
Rojitos	(*Hyphessobrycon rosaceus*, *H. serpae*)	349 860
Cuchas	(*Ancistrus* spp., *Chaetostoma* spp., *Cochliodon* spp., *Plecostomus* spp., *Pseudancistrus* spp., *Xenocara* spp.)	654 316
Loricarias	(*Loricaria* spp.)	178 580
Monedas	(*Metynnis* spp.)	26 280
Plecostomus	(*Hypostomus plecostomus*)	454 583
Pecamú	(*Microglanis* sp.)	134 510
Pencil	(*Poecilobrycon* spp.)	189 005
Emperadores	(*Nematobrycon palmeri*)	94 900
Rollizas (?)		12 050
Arrayanes (?)		700
Guabinas (?)		2 400
Muelones (?)		1 685
Various species		1 644 446
Total		8 479 446

Source of data: Statistical Services of INDERENA

Table 78

COLOMBIA - Registered movement of ornamental fish (1972)

Species		Number of fish
Corredoras	(Corydoras spp.)	3 114 652
Estrigatas	(Carnegiella strigata)	440 300
Escalares	(Pterophyllum scalare)	800 085
Lapices	(Nannostomus spp., Poecilobrycon spp.)	173 970
Neones	(Hyphessobrycon innesi)	1 342 960
Brillantes	(Hemigrammus armstrongi)	716 850
Cardenales	(Cheirodon axelrodi)	1 341 260
Cuchas	(Ancistrus spp., Chaetostoma spp., Cochliodon spp., Plecostomus spp., Pseudancistrus spp., Xenocara spp.)	2 271 365
Loricarias	(Loricaria spp.)	1 701 201
Mojarras	(Aequidens spp.)	251 915
Monedas	(Metynnis spp.)	394 532
Tetra verde	(Hyphessobrycon sp.)	446 400
Rojitos	(H. rosaceus, H. serpae, Magalamphodus sweglesi)	799 100
Tigritos	(Pimelodus pictus)	374 205
Gato negro	(Phractocephalus hemiliopterus)	52 046
Tetras sin especificar	(Hemigrammus spp., Hyphessobrycon spp.)	2 664 796
Pecamus	(Microglanis sp.)	120 320
Pechonas	(Carnegiella spp., Gasteropelecus spp.)	62 520
Ramirezis	(Apistogramma ramirezi)	125 400
Cuchillos	(Eigenmannia virescens, Gymnotus carapo, Sternarchus albifrons)	120 130
Otocinclos	(Otocinclus spp.)	250 000
Tetra azul	(Microbrycon fredcochui)	106 630
Chilodus	(Chilodus punctatus)	106 980
Other species		1 285 231
Total		19 152 828

Source of data: Statistical Services of INDERENA

Table 79

COLOMBIA (LETICIA AND AMAZONIA) - Registered movement of ornamental fish (1972)

Species		Number of fish
Apistogrammas	(Apistogramma spp.)	31 750
Abramites	(Abramites spp.)	17 240
Agassizi	(Corydoras agassizi)	2 131
Arahuanas	(Osteoglossum bicirrhosum)	2 275
Bagres (various types of catfish)		611
Cats sin especificar (various types of catfish)		1 500
Chilodus	(Chilodus punctatus)	1 180
Chirus (?)		3 500
Cuchillos	(Eigenmannia spp., Gymnotus spp., Sternarchus spp.)	16 123
Catalinas	(Bunocephalus coracoideus)	4 420
	Cichlasoma festivum	7 735
Corredoras	(Corydoras spp.)	1 320 399
Discos	(Symphysodon discus)	5 224
Doras	(Acanthodoras spp., Doras spp., Amblydoras spp.)	12 885
Elegantes	(Corydoras elegans)	5 280
Estrigatas	(Carnegiella strigata)	243 340
Escalares	(Pterophyllum scalare)	99 980
Hojas	(Monocirrhus polyacanthus)	4 125
Lapices	(Nannostomus spp., Poecilobrycon spp.)	65 700
Loricarias	(Loricaria spp.)	8 750
Leporinos	(Leporinus spp.)	8 015
Metines	(Metynnis spp.)	43 603
Milosomas	(Mylossoma spp.)	33 418
Neones	(Hyphessobrycon innesi)	753 950
Otocinclos	(Otocinclus spp.)	207 040
Oscares	(Astronotus ocellatus)	12 760
Puntatus	(Chilodus punctatus)	6 760
Pacamus	(Microglanis sp.)	4 400
Paletones	(Sorubim lima)	9 125
Pulcher	(Aequidens pulcher)	3 300
Pencil	(Poecilobrycon spp.)	3 000
Rebecas (?)		4 140
Rosaceos	(Hyphessobrycon rosaceus)	5 400
Sirarocu (?)		5 640
Saltón	(Hemiodus spp.)	8 200
Temblones	(Electrophorus electricus)	5 551
Tetraazul	(Microbrycon fredcochui)	106 630
Tetra loretos	(Hyphessobrycon peruvianus)	18 300
Tetras	(Hemigrammus spp., Hyphessobrycon spp.)	7 950
Other species		448 284
Total		3 540 614

Source of data: Statistical Services of INDERENA

Table 80

COLOMBIA - Numbers of ornamental fish species exported (1972)

Fish species		Number exported
Needle fish	(Ctenolucius hujeta)	419
Gold tetra	(Hemigrammus armstrongi)	265 500
	Corydoras spp.	839 584
	Eigenmannia sp., Gymnotus sp., Apteronotus sp.	69 647
Rummy nose tetra	(Hemigrammus rhodostomus)	57 000
Angel fish	(Pterophyllum scalare, P. altum)	23 554
Bloodfin	(Aphyocharax rubripinnis)	5 050
	Exodon paradoxus	8 100
Cardinal tetra	(Cheirodon axelrodi)	1 605 798
	Plecostomus sp., Ancistrus sp., Hemiancistrus sp.	1 727 635
Banjo catfish	(Bunocephalus sp.)	13 800
	Copeina spp.	1 000
Headstander	(Chilodus punctatus), Amblydoras sp., Acanthodoras sp., Doras sp.	26 210
Discus	(Symphysodon sp.)	859
Emperor tetra	(Nematobrycon palmeri)	144 450
Hatchets	(Carnegiella spp., Gasteropelecus spp.)	152 325
	Cichlasoma festivum	3 534
	C. severum	10 000
Pimelodidae		7 230
	Myloplus spp.	13 050
	Geophagus spp.	20 421
Guppies	(Lebistes reticulatus)	10 000
	Gobina sp.	400
Leaf fish	(Monocirrhus polyacanthus)	1 540
	Hemiodopsis spp.	37 862
	Ephippicharax spp.	6 000
	Hoplosternum spp.	80
Pencils	(Nannobrycon spp.)	6 940
	Loricaria spp.	80 599
	Farlowella spp.	46 800
Neon tetra	(Hyphessobrycon innesi)	612 200
	Leporinus spp.	19 200
	Metynnis spp.	152 446
Pike cichlids	(Crenicichla spp.)	554
	Colossoma spp.	6 100
	Aequidens spp.	294 991
Green tetra	(Hyphessobrycon sp.)	81 400
Oscar	(Astronotus ocellatus)	800
	Otocinclus spp.	69 700
	Pristolla spp.	1 000
	Pimelodella spp.	2 500
	Charax gibbosus	150
	Prochilodus spp.	7 220
	Arapaima gigas	240
	Microglanis sp.	59 400
Shovelnose	(Sorubim lima)	8 628
	Ephippicharax spp.	6 800
	Apistogramma ramirezi	72 650
	Rivulus sp.	700
	Megalamphodus sweglesi	443 400
	Chalceus macrolepidotus	600
	Apistogramma agassizi	300
	Abramites spp.	7 000
Arawana	(Osteoglossum bicirrhosum)	7 936
Barbillas	(Pimelodella sp.)	13 000
Bagridae		138
	Trichogaster trichopterus	5 000
	Pimelodus pictus	102 510

Table 80 (continued)

Fish species		Number exported
Loreto tetra	(Hyphessobrycon peruvianus)	17 300
	Cichla spp.	350
Blue tetra	(Hyphessobrycon sp.)	34 950
	Callichthys callichthys	257
Electric eel	(Electrophorus electricus)	4
Various species		23 704
Total		7 285 517

Table 81

COLOMBIA - Numbers of ornamental fish exported according to country of destination (1972)

	Fish species	Number of fish	Value (U.S.$)
FED. REP. OF GERMANY	Cheirodon axelrodi	82 000	2 870
	Corydoras spp.	33 210	1 331
	Exodon paradoxus	7 104	687
	Carassius auratus	9 000	180
	Hypostomus plecostomus	12 000	500
	Nannostomus spp.	5 000	200
	Hyphessobrycon innesi	20 825	501
	Otocinclus spp.	4 000	80
	Poecilobrycon spp.	4 620	231
	Megalamphodus sweglesi	4 000	170
	Plecostomus spp.	13 670	867
	Carnegiella strigata	3 000	220
	Hemigrammus, Hyphessobrycon spp.	11 000	520
	Xiphophorus helleri	3 500	175
	Other species	32 160	3 076
	Total	245 089	11 608
FRANCE	Cheirodon axelrodi	10 000	300
	Corydoras spp.	13 000	474
	Eigenmannia spp.	4 744	194
	Apistogramma ramirezi	5 714	184
	Metynnis spp.	4 000	160
	Microglanis sp.	5 000	100
	Hypostomus plecostomus	10 200	362
	Hemigrammus, Hyphessobrycon spp.	5 000	100
	Other species	7 834	424
	Total	67 850	3 125

	Fish species	Number of fish	Value (U.S.$)
MEXICO	Barbus spp.	1 000	5
	Cheirodon axelrodi	2 000	10
	Carnegiella strigata	500	2
	Hyphessobrycon innesi	2 000	6
	Hypostomus plecostomus	500	5
	Apistogramma ramirezi	500	3
	Poecilobrycon spp.	500	2
	Total	7 000	34
THE NETHERLANDS	Cheirodon axelrodi	25 000	70
	Carnegiella strigata	3 000	30
	Geophagus spp.	1 000	10
	Hyphessobrycon sp.	9 000	90
	Hemigrammus rhodostomus	4 900	24
	Apistogramma ramirezi	1 500	3
	Total	48 700	2 44
SWEDEN	Cheirodon axelrodi	116	
	Corydoras spp.	800	8
	Farlowella spp.	200	3
	Hyphessobrycon innesi	800	4
	Hypostomus plecostomus	600	6
	Apistogramma ramirezi	400	4
	Total	2 916	25

Table 81 (continued)

	Fish species	Number of fish	Value (U.S.$)
ITALY	Cheirodon axelrodi	210	10
	Corydoras spp.	320	32
	Hyphessobrycon innesi	350	17
	Hypostomus plecostomus	170	17
	Apistogramma ramirezi	230	23
	Total	1 280	99

	Fish species	Number of fish	Value (U.S.$)
U.S.A.	Pimelodus pictus	25 193	8 993
	Apistogramma spp.	27 500	2 175
	Fancy goldfish	21 000	3 100
	Barbus spp.	18 813	972
	Betta spp.	71 388	7 665
	Trichogaster trichopterus	10 000	700
	Hyphessobrycon peruvianus	45 000	1 350
	Cheirodon axelrodi	1 346 985	94 929
	Chalceus macrolepidotus	17 000	17 000
	Chilodus punctatus	99 035	12 222
	Corydoras spp.	985 677	135 915
	C. metae	10 000	700
	Symphysodon discus	16 952	46 564
	Xiphophorus helleri	14 000	700
	Nematobrycon palmeri	32 661	5 460
	Farlowella spp.	59 910	9 288
	Geophagus spp.	30 170	27 170
	Goldfish	14 000	1 400
	Hemigrammus armstrongi	58 996	2 374
	Lebistes reticulatus	20 500	650
	Poecilobrycon spp.	25 570	1 323
	Leporinus spp.	10 001	2 964
	Loricaria spp.	147 414	15 875
	Carnegiella strigata	44 592	2 500
	Metynnis spp.	118 107	13 839
	Mylossoma spp.	10 000	5 000
	Myloplus spp.	22 200	5 080
	Hyphessobrycon innesi	203 762	10 475
	Microglanis sp.	106 881	11 516
	Plecostomus spp.	1 309 972	165 703
	Pimelodella spp.	52 252	8 510
	Apistogramma ramirezi	196 030	17 021
	Megalamphodus sweglesi	92 002	3 850
	Hyphessobrycon rosaceus, H. serpae	33 500	2 850
	Gasteropelecus levis	15 000	450
	Hyphessobrycon spp.	206 000	12 690
	Microbrycon fredcochui	15 500	1 550
	Pimelodus pictus	97 822	16 205
	Other species	138 796	48 278
	Total	5 770 181	725 006

Source of data: Statistical Services of INDERENA

Table 82

COLOMBIA - Number of ornamental fish species exported (1973)

Fish species		Number
Ararí	(Chalceus macrolepidotus)	12 421
Agassizi	(Apistogramma agassizi)	4 000
Abramites	(Abramites spp.)	22 543
Argentinas		250
Apistogramas	(Apistogramma spp.)	10 580
Agujones	(Ctenolucius hujeta)	955
Arawanas	(Osteoglossum bicirrhosum)	21 172
Blanquillos	(Sorubim lima)	60
Brillantes	(Hemigrammus armstrongi)	1 035 100
Bagres	(Bagridae)	442
Bagre morichalero		88
Bagre sapo	(Pseudopimelodus bufonius)	248
Bagre amarillo	(Pimelodus ornatus)	76
Cuchillas	(Eigenmannia sp., Gymnotus carapo)	44 500
Cara bonita		120
Corredores	(Corydoras spp.)	1 389 643
Cardenales	(Cheirodon axelrodi)	1 578 195
Cuchas	(mainly Ancistrus spp.)	2 104 920
Cuchillos	(Sternarchus albifrons)	52 665
Cachamas	(Colossoma sp.)	1 150
Coli-rojo	(Aphyocharax rubripinnis)	52 625
Catalinas	(Pterophyllum spp.)	92 000
Cabeci-rojo	(Hemigrammus rhodostomus)	45 700
Copeinas	(Copeina spp.)	9 950
Cuatro lineas	(Pimelodella spp.)	9 550
Chilodos	(Chilodus punctatus)	133 300
Cabeza de palo		275
Colosomas	(Colossoma spp.)	100
Cichlids		9 400
Cajaros	(Phractocephalus sp.)	112
Ciclosomas	(Cichlasoma spp.)	1 200
Doras	(Amblydoras, Acanthodoras, Doras spp.)	26 120
Discos	(Symphysodon discus)	1 764
Dos puntos	(Exodon paradoxus)	6 250
Dormitator	(Dormitator sp.)	50
Emperadores	(Nannobrycon palmeri)	122 700
Estrigatas	(Carnegiella strigatus)	505 152
Exodon	(Exodon paradoxus)	640
Elegans	(Corydoras elegans)	2 480
Escalares	(Pterophyllum altum, P. scalare)	41 030
Festivos	(Cichlasoma festivum)	700
Falso disco	(C. severum)	10 093
Favolitas	(Farlowella sp.)	500
Gold tetra	(Hemigrammus armstrongi)	3 000
Gato	(Pimelodidae)	8 600
Ganchos rojos	(Myloplus spp.)	5 067
Geofagos	(Geophagus spp.)	4
Gobis	(Gobius spp.)	10 500
Hojas	(Monocirrhus polyacanthus)	2 199
Hemiodos	(Hemiodopsis spp.)	18 450
Hilo negro	(Ephiphicharax spp.)	13 100
Hachas	(Carnegiella spp., Gasteropelecus spp.)	1 000
Itui	(Apteronotus sp.)	3 250
Infanatus		6 300
Jibosos	(Charax gibbosus)	1 535
Juan viejo	(Geophagus spp.)	42 381
Lapices	(Nannobrycon spp.)	46 920
Lisas	(Anostomus taeniata)	4 680

Table 82 (continued)

Fish species		Number
Loricarias	(Loricaria spp.)	210 328
Lapiceros	(Farlowella spp.)	95 920
Leporinos	(Leporinus spp.)	12 931
Metines	(Metynnis spp.)	136 535
Monedas	(Metynnis spp.)	265 740
Matahuaros	(Crenicichla spp.)	3 383
Milosomas	(Mylossoma spp.)	31 500
Morocotos	(Colossoma spp.)	15 444
Mojarras	(Aequidens spp.)	459 925
Metas	(Corydoras metae)	58 200
Marginatus	(Naunostomus marginatus)	1 000
Neones	(Hyphessobrycon innesi)	443 725
Neones verdes	(Hyphessobrycon sp.)	347 000
Oscares	(Astronotus ocellatus)	201
Ojo de fuego	(Cichlasoma meeki)	4 770
Otocinclos	(Otocinclus spp.)	262 720
Pico rojo	(Myloplus spp.)	60 900
Pimelodelas	(Pimelodella spp.)	5 500
Palometas	(Myloplus spp.)	12 404
Pacamues	(Microglanis sp.)	136 150
Paletones	(Sorubim lima)	20 989
Pirañas		34
Prochilodos	(Prochilodus spp.)	14 246
Pulcher	(Apistogramma pulcher)	5 800
Piñas	(Ba[illegible] sp.)	5 500
Pavones	(Cichla ocellaris)	350
Pacu	(Colossoma sp.)	150
Picalones		50
Pacotinos		100
Pez gallo		120
Pampano		3 845
Palomas		1 000
Plecostomus	(Plecostomus spp.)	11 400
Rositas	(Rhodochromis spp.)	7 100
Rodostomos	(Hemigrammus rhodostomus)	253 300
Ramirezis	(Apistogramma ramirezi)	263 550
Ruminose	(Hemigrammus rhodostomus)	100
Rebecas		2 050
Riqui raqui	(Doras spp.)	137 050
Rojitos	(Megalamphodus sweglesi)	887 600
Rosardinas		1 500
Rosaceus	(Hyphessobrycon rosaceus)	2 300
Rubis	(Axelrodia riesei)	10 100
Rojitos falsos	(Pristella spp.)	200
Rabo de oro		80
Rayas	(Pomatotrygon sp.)	36
Sardina azul		400
Sapuaras	(Prochilodus sp.)	10 997
Sierras		2 800
Surubin	(Sorubim lima)	351
Tigritos	(Pimelodus pictus)	363 425
Torpedos		4 100
Tridaciato		5 500
Transparentes	(Eigenmannia virescens)	3 000
Tetras loreto	(Hyphessobrycon peruvianus)	39 950
Tetras azules	(Mimagoniates microlepis)	55 080
Tetras (various species)		29 400
Tijeros	(Hemiodopsis spp.)	73 105
Tucunares	(Cichla ocellaris)	15 850
Toritos	(Callichthys callichthys)	717

Table 82 (continued)

Fish species		Number
Temblones	(Electrophorus electricus)	55
Talleri	(Thayeria spp.)	550
Tetras rojas	(Hyphessobrycon spp.)	400
Yaques		52
Verdes	(Hyphessobrycon sp.)	28 000
Various		53 113
Total		12 409 242

Source of data: INDERENA/FAO Inland Water Fisheries Development Project

Table 83

COLOMBIA - Numbers of ornamental fish exported according to country of destination (1974)

Country	Fish species	Number of fish	Value (U.S.$)
BELGIUM	Cheirodon axelrodi	500	15
	Corydoras spp.	4 000	280
	Eigenmannia spp.	200	10
	Hemigrammus armstrongi	4 000	160
	Hyphessobrycon spp.	200	40
	Plecostomus spp.	6 000	420
	Various	100	10
	Total	15 000	935
FED. REP. OF GERMANY	Abramites spp.	382	56
	Acanthodoras spp. (with Amblydoras spp.)	500	50
	Aequidens spp.	50	20
	Ancistrus spp.	12 500	695
	Apistogramma ramirezi	17 500	7 986
	Apistogramma spp.	6 550	386
	Bunocephalus coracoideus	700	60
	Capoeta spp. (syn. Barbus spp.)	300	30
	Carnegiella strigata	19 250	1 200
	Cheirodon axelrodi	513 860	30 510
	Chilodus punctatus	2 000	400
	Cichlids	22 200	2 640
	Copeina spp.	5 300	350
	Corydoras spp.	139 870	20 173.30
	Doras spp.	6 900	632
	Eigenmannia spp. (with Apteronotus spp. and Gymnotus spp.)	1 100	305
	Electrophorus electricus	2	15
	Farlowella spp.	2 000	200
	Gasteropelecus sternicla	2 000	160
	Geophagus spp.	1 000	756
	Hemigrammus armstrongi	31 090	1 520
	H. rhodostomus	11 750	724.80
	Hemigrammus spp.	800	180
	Hemiodus spp.	1 680	460.50
	Hoplosternum spp.	300	20

Table 83 (continued)

Country	Fish species	Number of fish	Value (U.S.$)
FED. REP. OF GERMANY	Hyphessobrycon innesi	105 800	4 200
	H. peruvianus	3 700	199
	Hyphessobrycon spp.	61 205	38 535
	Loricaria spp.	10 030	1 030
	Metynnis spp.	12 800	1 085
	Microglanis sp.	5 100	285
	Nannostomus spp.	1 600	48
	Osteoglossum bicirrhosum	2 140	1 746
	Otocinclus spp.	35 167	1 186
	Pimelodella spp.	9 900	2 110
	Pimelodus pictus	6 200	1 040
	Plecostomus spp.	83 100	8 240
	Pterophyllum scalare	1 741	1 046.30
	Sorubim lima	45	20
	Various	41 840	3 885.20
	Total	1 179 952	134 185.10
FRANCE	Abramites spp.	200	100
	Acanthodoras spp. (with Amblydoras spp.)	100	20
	Apistogramma ramirezi	5 000	300
	Apistogramma spp.	1 450	145
	Brachyrhaphis coracoideus	3 500	400
	Cheirodon axelrodi	19 000	970
	Chaetobranchus punctatus	200	30
	Corydoras spp.	15 500	1 140
	Ctenobrycon spp.	150	15
	Cichlasoma festivum	250	25
	Farlowella spp.	200	30
	Hemigrammus rhodostomus	5 000	290
	Hemiodus spp.	100	20
	Hoplosternum spp.	700	120
	Hyphessobrycon spp.	2 000	100
	Loricaria spp.	1 800	180
	Megalamphodus sweglesi	6 000	180
	Metynnis spp.	1 100	170
	Otocinclus spp.	3 200	160
	Pimelodella spp.	3 300	690
	Plecostomus spp.	9 500	890
	Various	1 000	80
	Total	79 250	6 055
MEXICO	Acanthodoras spinosissimus	80	12
	Apistogramma ramirezi	500	50
	Aphyocharax rubropinnis	500	50
	Chalceus macrolepidotus	30	15
	Charax gibbosus	1 000	100
	Cheirodon axelrodi	7 000	490
	Copeina spp.	1 250	125
	Corydoras spp.	2 450	254
	Hemigrammus armstrongi	2 000	120
	H. rhodostomus	150	15
	Hyphessobrycon spp.	3 000	220
	Loricaria spp.	700	70
	Megalamphodus sweglesi	1 250	125
	Metynnis spp.	200	40
	Microglanis sp.	500	75
	Plecostomus spp.	2 100	220
	Various	650	97.50
	Total	23 360	2 078.50

Table 83 (continued)

Country	Fish species	Number of fish	Value (U.S.$)
THE NETHERLANDS	Acanthophthalmus spp.	1 500	30
	Carnegiella strigata	3 000	150
	Cheirodon axelrodi	20 000	550
	Corydoras spp.	3 700	185
	Hemigrammus armstrongi	5 000	50
	Hyphessobrycon spp.	20 000	600
	Megalamphodus sweglesi	4 500	90
	Metynnis spp.	5 000	300
	Nannostomus spp.	500	40
	Osteoglossum bicirrhosum	100	50
	Otocinclus spp.	2 500	75
	Pimelodella spp.	5 500	350
	Pimelodus pictus	1 500	75
	Plecostomus spp.	9 000	420
	Pterophyllum scalare	200	60
	Total	85 500	3 110
SPAIN	Apistogramma spp.	200	20
	Carnegiella strigata	400	32
	Cheirodon axelrodi	1 600	64
	Chilodus punctatus	100	13
	Cichlasoma spp.	180	28
	Corydoras arcuatus	200	16
	C. elegans	150	12
	C. julii	120	10.80
	C. metae	120	9.60
	Corydoras spp.	750	65
	Eigermannia spp.	100	13
	Gasteropelecus levis	250	22.50
	Hemigrammus rhodostomus	200	14
	Hemigrammus spp.	1 250	50
	Hemiodus spp.	30	7.50
	Hoplosternum spp.	120	14.40
	Metynnis spp.	40	8
	Nannostomus spp.	300	15
	Otocinclus spp.	400	20
	Pterophyllum scalare	30	13.50
	Various	650	84
	Total	7 190	532.30
U.K.	Abramites spp.	2 550	450
	Aequidens pulcher	480	57.60
	Aphyocharax rubropinnis	1 500	150
	Astronotus ocellatus	200	32
	Cheirodon axelrodi	21 000	930
	Cichla ocellaris	1 000	280
	Corydoras spp.	22 800	1 197
	Hemigrammus armstrongi	500	45
	Hyphessobrycon innesi	5 000	250
	H. peruvianus	1 200	120
	Hyphessobrycon spp.	2 400	120
	Megalamphodus sweglesi	7 200	576
	Nannostomus spp.	1 200	216
	Phractocephalus hemiliopterus	2	5
	Plecostomus spp.	7 000	504
	Prochilodus insignis	450	90
	Sorubim lima	200	50
	Various	600	117
	Total	75 282	5 189.60

Table 83 (continued)

Country	Fish species	Number of fish	Value (U.S.$)
U.S.A.	Abramites spp.	7 700	1 285
	Acanthodoras spp.	41 400	5 338
	Acanthophthalmus spp.	23 000	1 060
	Aequidens pulcher	25 500	1 300
	Aequidens spp.	6 350	336
	Aphyocharax rubropinnis	30 720	3 106.40
	Apistogramma ramirezi	384 840	28 112.40
	Apistogramma spp.	9 160	256
	Axelrodia riesei	11 000	220
	Betta spp.	25 000	1 400
	Bunocephalus coracoideus	49 000	5 134
	Carnegiella strigata	149 950	10 438
	Chalceus macrolepidotus	17 261	16 581.86
	Charax gibbonus	700	70
	Cheirodon axelrodi	2 462 212	107 695.36
	Chirodus punctatus	294 280	20 437.25
	Cichla ocellaris	250	62.50
	Cichlasoma spp.	5 200	338
	Cichlids	12 000	1 200
	Copeina spp.	2 000	200
	Corydoras metae	1 800	540
	Corydoras spp.	1 120 805	130 202.98
	Crenicara spp.	1 000	100
	Ctenolucius hujeta	380	670
	Doras spp.	16 050	1 856
	Electrophorus spp. (with Apteronotus spp. and Gymnotus spp.)	104 829	8 317.80
	Electrophorus electricus	510	2 100
	Ephiphicharax spp.	2 700	100
	Exodon paradoxus	8 660	2 380
	Farlowella spp.	32 920	2 447.20
	Geophagus jurupari	15 500	3 760
	Geophagus spp.	30 260	4 629
	Gobies spp.	4 800	480
	Hemigrammus armstrongi	396 700	12 569
	H. rhodostomus	159 300	8 906
	Hemigrammus spp.	140 000	8 000
	Hemiodus spp.	63 600	9 280
	Hoplosternum spp.	19 000	2 684
	Hyphessobrycon innesi	438 966	21 285.91
	Hyphessobrycon spp.	450 820	46 465.83
	Lebistes reticulatus	42 000	2 700
	Leporinus fasciatus	20 920	5 145
	Loricaria spp.	65 620	11 342.40
	Megalamphodus sweglesi	309 693	16 320.45
	Metynnis spp.	240 543	24 757.60
	Microglanis sp.	169 495	18 822.35
	Molliensia spp.	2 000	60
	Monocirrhus polyacanthus	1 180	494
	Myloplus spp.	55 281	4 648.55
	Mylossoma spp.	3 500	1 772
	Nannostomus spp.	31 700	1 473
	N. trifasciatus	1 800	540
	Nematobrycon palmeri	21 600	3 970
	Osteoglossum bicirrhosum	28 700	36 115
	Otocinclus spp.	61 000	4 820
	Pimelodella spp.	157 151	39 573
	Pimelodus pictus	1 196 900	41 006
	Phractocephalus hemiliopterus	300	630
	Plecostomus spp.	1 574 588	140 980.33

Table 83 (continued)

Country	Fish species	Number of fish	Value (U.S.$)
U.S.A.	Prochilodus insignis	600	390
	Prochilodus spp.	2 300	457
	Pterophyllum scalare	5 295	1 389.50
	Sorubim lima	295	82.50
	Symphysodon spp.	500	1 500
	Various	189 937	27 646.75
	Total	10 749 021	901 914.92

Source of data: Statistical Services of INDERENA

Table 84

INDONESIA - List of ornamental fish exported

Freshwater fish	Saltwater fish
Macrones sp.	Amphiprion percula
Leioassis stenomus	Abudefduf biocellatus
Pseudotropius moulenburghae	Chromis caeruleus
Tetraodon reticularis	Chelmon rostratus
Lusiosoma setigerum	Parachaetodon ocellatus
Zenarhopterus ectuntio	Pomacanthus semicirculatus
Puntius tetrazona	Pygoplites diacanthus
Botia macracanthus	Centropyge bicolor
Puntius schwanenfeldi	C. tibicen
Cryptopterus bicirrhis	Zanclus cornutus
Botia hymenophysa	Zebrasoma veliferum
Cryptopterus cryptopterus	Paracanthurus teuthis
Betta picta	Acanthurus lineatus
B. splendens	Balistes flavimarginatus
Balantiochilus melanopterus	Odonus niger
Puntius fasciatus	Balistoides conspicilium
Rasbora trilineata	Hippocampus kuda
Rasbora spp.	Acoliscus strigatus
Chela oxygastroides	Pterois volitans
Hampala macrolepidota	Apogon bifasciatum
H. ampalong	Lactoria cornuta
Epalzeorhynchus kallopterus	Chromileptis altivelis
Sphaerichthys osphromonoides	Myripristis murdjan
Trichogaster microlepis	Holocentrus rubrum
Labeo chryspekadion	Coris greenovii
Trichogaster leeri	C. gaimard
T. trichopterus	Novaculichthys taeniurus
Toxotes jaculator	Gomphosus varius
	Anampses meleagridis
	Halichoeres nigriscans
	Hemigymnus melapterus
	Thallasoma lunare
	Bodianus mesothorax

Source of data: Personal communication from Indonesian Directorate General of Fisheries (1974)

Table 85

PERU - Principal species of ornamental fish exported (1969)

Fish species		Number exported	Unit price (U.S.$)
Neon tetra	(Hyphessobrycon innesi)	5 179 100	0.02
Spotted catfish	(Corydoras punctatus)	813 365	0.025
Bleeding-heart tetra	(Hyphessobrycon rubrostigma)	729 390	0.025
Leopard catfish	(Corydoras julii)	520 760	0.03
San Juan catfish	(Corydoras sp.)	412 600	0.02
Rummy-nose tetra	(Hemigrammus rhodostomus)	260 230	0.025
Elegant catfish	(Corydoras elegans)	226 849	0.02
Aeneus catfish	(C. aeneus)	212 280	0.025
Blue tetra	(Microbrycon fredcochui)	202 850	0.02
Midget-sucker catfish	(Otocinclus affinis)	202 850	0.02

Table 86

PERU - Numbers of ornamental fish exported (1974)

Fish species	Number of fish	Months J	F	M	A	M	J	J	A	S	O	N	D
Abramites sp.	16 773	x	x				x	x	x	x	x	x	x
Aequidens maronii	400		x				x						
Apistogramma spp.	45 985	x	x		x	x	x	x	x	x	x	x	x
Anostomus sp.	5 735		x			x	x	x	x	x	x	x	x
Poecilobrycon auratus	202 530	x	x				x	x	x	x	x	x	x
Aphyocharax rubropinnis	205 695	x	x		x	x	x	x	x	x	x	x	x
Acanthodoras spp.	4 760	x	x	x	x								x
Bunocephalus coracoideus	27 280	x	x		x		x	x	x	x	x	x	x
Corydoras arcuatus	207 120	x	x		x		x	x	x	x	x	x	x
C. agassizi	121 450	x	x	x	x	x	x	x	x	x	x	x	x
C. elegans	411 720	x	x	x	x	x	x	x	x	x	x	x	x
C. hastatus	196 600	x	x	x	x	x	x	x	x	x	x	x	x
C. julii	1 014 270	x	x	x	x	x	x	x	x	x	x	x	x
C. melanistius	7 010		x	x						x	x		
C. punctatus	1 892 560	x	x	x	x	x	x	x	x	x	x	x	x
C. rabauti	41 640	x	x	x	x	x	x	x	x	x	x	x	x
Green catfish	39 570	x	x	x	x	x	x	x	x	x	x	x	x
Catfish (unspecified)	74 361	x	x		x	x	x	x	x	x	x	x	x
Characidium spp.	1 380				x	x	x	x					
Chilodus punctatus	89 300	x	x	x	x	x	x	x	x	x	x	x	x
Cichlasoma festivum	59 794	x	x	x	x	x	x	x	x	x	x	x	x
C. severum	15 819	x	x	x	x	x	x		x	x		x	x
Acanthodoras spinossisimus	219 330	x	x	x	x	x	x	x	x	x	x	x	x
Copeina spp.	2 450				x	x			x		x	x	
Bamby catfish (?)	24 920	x	x				x	x	x	x			
Microbrycon fredcochui	205 695	x	x	x	x	x	x	x	x	x	x	x	x
Farlowella spp.	1 475						x	x	x	x	x	x	
Gasteropelecus levis	4 360	x	x										x
Hemiodus spp.	24 810	x	x	x					x				
Leporinus fasciatus	133 141	x	x	x	x	x	x	x	x	x	x	x	x
L. frederici	2 510	x	x			x	x	x	x	x	x	x	x
Astronotus ocellatus	5 870	x	x	x	x	x	x						
Tukan fish (?)	17 303	x	x	x	x	x	x	x	x	x	x	x	x
Monocirrhus polyacanthus	803	x					x	x	x	x		x	
Metynnis and Mylossoma spp.	83 972	x	x	x	x	x	x	x	x	x	x	x	x
Macanas (?)	12 990	x	x	x	x	x	x	x	x			x	x

Table 86 (continued)

Fish species	Number of fish	Months J	F	M	A	M	J	J	A	S	O	N	D
Carnegiella marthae	440 270	x	x	x	x	x	x	x	x	x	x	x	x
C. strigata	284 130	x	x	x	x	x	x	x	x	x	x	x	x
Moenkhausia spp.	5 300	x		x	x	x	x		x				x
Hyphessobrycon innesi	6 089 914	x	x	x	x	x	x	x	x	x	x	x	x
Hemigrammus ocellifer	6 310		x	x	x	x			x	x	x	x	x
Hyphessobrycon erythrostigma	922 125	x	x	x	x	x	x	x	x	x	x	x	x
Hemigrammus rhodostomus	150 855	x	x	x	x	x	x	x	x	x	x	x	x
H. ulreyi	18 000		x		x	x	x	x					
Hyphessobrycon peruvianus	123 170	x	x	x	x	x	x	x	x	x	x	x	x
H. rosaceus	28 756	x	x	x	x	x	x	x	x	x	x	x	x
Ctenolucius hujeta	171	x					x	x				x	x
Prochilodus spp.	47 350	x	x	x	x							x	x
Plecostomus spp.	377 866	x	x	x	x	x	x	x	x	x	x	x	x
Phractocephalus hemiliopterus	771	x	x	x			x	x	x	x	x	x	x
Hoplosternum spp.	223 220	x	x	x	x	x	x	x	x	x	x	x	x
Pimelodella spp.	60 520	x	x	x		x	x	x	x	x	x	x	x
Tetra robertis	239 280	x	x	x	x	x	x	x	x	x	x	x	x
Paratrygon sp.	40	x	x			x			x	x		x	x
Pterophyllum scalare	91 295	x	x	x	x	x	x	x	x	x	x	x	x
Puffer	500	x	x										
Piranas	380											x	x
San Juan catfish	368 390	x	x	x	x	x	x	x	x	x	x	x	x
Nannostomus trifasciatus	74 535	x	x		x		x	x	x	x	x	x	x
Osteoglossum bicirrhosum	54 575	x	x	x	x						x	x	x
Electrophorus electricus	293	x	x					x			x	x	
Symphysodon spp.	2 848		x	x	x			x				-	
Thoracocharax spp.	990			x				x					
Pseudoplatystoma fasciatum	971	x	x	x	x	x	x	x	x	x	x	x	x
Turushuqui (?)	522	x	x	x	x		x	x	x	x	x	x	x
Loricaria spp.	57 970	x	x				x	x	x	x	x	x	x
Yellow catfish (?)	800	x	x										
Sapo pipa (?)	150	x											
Churos (?)	4 620		x	x		x							
Prochilodus (?) amazonensis	750					x							
Zebra (?)	600					x							
Otocinclus spp.	707 150	x	x	x	x	x	x	x	x	x	x	x	x
Total	15 743 653												

Source of data: Empresa Pública de Certificaciones Pesqueras del Perú, Lima (1975)

Table 87

(a) U.S.A. - Ornamental fish species most commonly imported through the Port of New York (June-July 1974)

Fish species		% of total fish imported
Neon tetra	(Hyphessobrycon innesi)	18.90
Cardinal tetra	(Cheirodon axelrodi)	6.00
Armoured catfish	(principally Corydoras aeneus, C. julii, C. melanistius)	5.67
Angel fish	(Pterophyllum scalare)	4.98
Siamese fighting fish	(Betta splendens)	4.41
Goldfish	(Carassius auratus)	3.61
Guppy	(Lebistes reticulatus)	3.21
Sucker catfish	(Hypostomus plecostomus)	2.43
Oscar	(Astronotus ocellatus)	2.42
Coolie loach	(Acanthophthalmus kuhlii)	2.32
	Thayeria sanctaemaria	2.30
Red-tailed shark	(Labeo bicolor)	2.17
Marbled hatchet fish	(Carnegiella strigata)	2.16
Red rasbora	(Rasbora heteromorpha)	2.09
Platy	(Xiphophorus maculatus)	1.99
Tiger barb	(Barbus tetrazona)	1.92
Hatchet fish	(Gasteropelecus sp.)	1.86
Sailfin molly	(Mollienesia latipinna)	1.64
Golden tetra	(Hemigrammus armstrongi)	1.48
Banded cichlid	(Cichlasoma severum)	1.17
Long-whisker catfish	(Pimelodella gracilis)	1.08
Chinese algae-eater	(Gyrinocheilus aymonieri)	1.02
White cloud mountain minnow	(Tanichthys albonubes)	0.91
Total		84.74

(b) U.S.A. - Ornamental fish species most commonly imported for the month of October 1971

Fish species		Number imported
Neon tetra	(Hyphessobrycon innesi)	1 100 000
Cardinal tetra	(Cheirodon axelrodi)	600 000
Siamese fighting fish	(Betta splendens)	600 000
Angel fish	(Pterophyllum scalare)	400 000
Guppy	(Lebistes reticulatus)	300 000
Chinese algae-eater	(Gyrinocheilus aymonieri)	300 000
Sucker catfish	(Hypostomus plecostomus)	200 000
Armoured catfish	(Corydoras aeneus)	100 000
Armoured catfish	(C. julii)	100 000
Coolie loach	(Acanthophthalmus kuhlii)	100 000
White cloud mountain minnow	(Tanichthys albonubes)	100 000
Red rasbora	(Rasbora heteromorpha)	100 000
Tiger barb	(Barbus tetrazona)	100 000
Hatchet fish	(Gasteropelecus sternicola)	100 000
Marbled hatchet fish	(Carnegiella strigata)	100 000
Total		4 300 000

Source of data: U.S.D.I. Draft Environmental Statement DES 75-6 (1975)

Table 88

U.S.A. - Numbers of ornamental fish imported (1968-72)

Year	Number of fish
1968	64 254 190
1969	73 694 996
1970	83 867 029
1971	98 971 579
1972	112 291 686

Source of data: U.S.D.I. Draft Environmental Statement DES 75-6 (1975)

Table 89

VENEZUELA - Principal species of ornamental fish exported (1974)

Fish species	Number exported
Plecostomus sp.	1 500 000
Corydoras sp.	1 500 000
C. melanistius	1 000
Hyphessobrycon sp.	1 500 000
H. innesi	3 000
Cheirodon sp.	1 521 000
Nannostomus sp.	750 000
Apistogramma ramirezi	750 000
Gasteropelecus sp.	750 000
Bunocephalus sp.	375 000
Mollienesia sp.	750 000
Pseudoplatystoma sp.	7 500
Ancistrus sp.	20 000
Astronotus sp.	300 000
Colossoma sp.	22 500
Petenia sp.	30 000
Geophagus sp.	22 500
Anostomus sp.	30 000
Leporinus sp.	75 000
Tetraodon sp.	75 000
Callichthyid catfish	30 000
Megalops	75 000
Metynnis sp.	75 000
Pterophyllum scalare	75 000

Source of data: Cortéz (1974)

APPENDIX V

List of species of ornamental and other fish whose introduction into individual states of the U.S.A. is prohibited by legislation

State	Fish Species
Alabama	All species of piraña, and fish of the genera Pygocentrus, Rooseveltiella and Serrasalmo.
Alaska	"Tropical" fish may be introduced, as it is considered unlikely they would survive if released.
Arizona	Snakeheads (Ophiocephalidae), walking catfish (Claridae), Belonesox spp., Paratrygon spp., South American parasitic catfish (Cetopsidae and Trichomycteridae), electric eels (Electrophorus spp.), Hoplias malabaricus, Arapaima gigas.
Arkansas	Piraña, Astyanax fasciatus, walking catfish.
California	Hoplias malabaricus, Asian and African catfish (Claridae), Astyanax fasciatus, piranas (all genera), Belonesox spp., wild carp (domesticated species are permitted), cetopsid and trichomycterid catfish, Potamotrygon spp.
Connecticut	Walking catfish (Claridae) and pirañas; all other aquarium species may be imported into the State without a licence.
Florida	Electric eels (Electrophorus spp.), Potamotrygon spp., snakehead (Channa spp.), walking catfish (Claridae), peacock bass (Cichla sp.), dorado (Salminus affinis, S. brevidens, S. hilarii, S. maxillosus), piranas (all species), Ophiocephalus spp., Cyprinus carpio, tilapias (all species), cetopsid and trichomycterid catfish; all ornamental fish not included in the above list may be imported freely, under licence, to registered dealers and the numbers of such fish to be imported must be given.
Georgia	Walking catfish (Claridae) and pirañas (Serrasalmo spp.).
Illinois	A licence is required for all persons selling live fish, and regulations exist to control the transportation of live fish within and through the State.
Kentucky	Pirañas (Serrasalmo spp. and others), Astyanax fasciatus, walking catfish (Claridae), snakeheads (Ophiocephalus spp., Channa spp.); all other species of "aquarium fish" may be imported, sold and maintained in aquaria.
Louisiana	Pirañas (all species), Astyanax fasciatus; a permit is required for tilapias (all species), walking catfish (Claridae), carp, cetopsid and trichomycterid catfish, electric eels.
Maine	Pirañas (Serrasalmo spp.), walking catfish (Claridae); "tropical fish" for aquarium purposes, other than the aforementioned species, may be imported and maintained without a permit.
Maryland	"Pet fish" are exempted from permit requirements.
Michigan	Japanese weather fish (Misgurnus anguillicaudatus).
Mississippi	Pirañas (all species), walking catfish (Claridae), Astyanax fasciatus.
Missouri	Walking catfish (Claridae).
Nevada	Pirañas (Serrasalmo spp., Rooseveltiella spp., Pygocentrus spp.), Hoplias malabaricus, snakeheads (Channa spp., Ophiocephalus spp.), tilapias (all species); a permit is required to import all species of ornamental fish not included in the above list, whose introduction into the State is prohibited.
New Jersey	Carp (Cyprinus carpio).
New Mexico	No prohibited species, but a permit is required for all importations.
New York	Pirañas (all species); "aquarium fish" may be introduced without a permit, always provided that the fish are to be maintained in an aquarium.

State	Fish Species
North Carolina	Clarias batrachus, piranas (all species); all other species transported in the State require a permit.
Ohio	Walking catfish (Claridae).
Oklahoma	Walking catfish (Claridae), Arapaima gigas, Serrasalmo nattereri, S. punctatus, S. rhomboides, S. piraya, S. spilopleura, electric eels (Electrophorus), Belonesox belizanus, snakeheads (Ophiocephalus spp., Channa spp.), cetopsid and trichomycterid catfish, Pygidium spp., Paratrygon spp.; "tropical fish" other other than the above-listed species may be imported into the State without a permit.
Oregon	Piranas (all species).
Pennsylvania	All "tropical fish" species may be imported without a permit, unless the species concerned is considered to be potentially dangerous to native fish species in the State.
South Carolina	Walking catfish (Claridae).
South Dakota	No "minnows" except "ornamentals" may be transported into the State or through the State from other states or countries.
Tennessee	Piranas (all species), walking catfish (Claridae), Astyanax fasciatus.
Texas	A special permit is required for the importation of piranas (all species), Arapaima gigas, electric eels (Electrophorus spp.), snakeheads (Channa spp., Ophiocephalus spp.), Cichla ocellaris, Pygidium spp., cetopsid and trichomycterid catfish, Paratrygon spp., Clarias batrachus; a permit may be granted for the importation of the above-named fish where these are to be displayed in an aquarium.
Utah	Cyprinids, Astyanax fasciatus, cetopsid and trichomycterid catfish, piranas (all species), Belonesox belizanus, snakeheads (Ophiocephalidae), walking catfish (Claridae), Hoplias malabaricus; the importation of "tropical fish" other than the above-mentioned species is exempt from importation requirements, as is the importation of goldfish.
Wisconsin	Goldfish.

Source of data: Axelrod (1973a)

APPENDIX VI

List of freshwater ornamental fish included in the "clean list" of the U.S. authorities as low-risk wildlife

Family	Genus and Species (if given)	Common Name
Ageneiosidae	Ageneiosus	-
Amphiliidae	Phractura	-
Anabantidae	Ctenopoma	short climing perches
Anablepidae	Anableps	foureyed fishes
Anostomidae	Abramites	marbled headstanders
	Anostomus	headstanders
	Laemolyta	crossband headstanders
	Leporinus	spotted pencils
	Tylobranchus	sergeant headstanders
Apteronotidae (grouped together Gymnotidae and Rhamphichthyidae)	Apteronotus	quillback knives
	Eigenmannia	glass knives
	Gymnorhamphichthys	-
	Hypopomus	spotted glass knives
	Odontosternarchus	-
	Oedemognathus	-
	Orthosternarchus	-
	Porosternus	-
	Rabdolichops	-
	Rhamphichthys	long-nose knives
	Steatogenys	-
	Sternarchella	-
	Sternarchogiton	-
	Sternarchorhynchus	-
	Sternarchus	ghost fishes
	Sternopygus	-
	Tateichthys	-
	Ubidia	-
	Uramara	-
Aspredinidae	Agmus	-
	Amaralia	-
	Aspredinichthys	-
	Aspredo	-
	Bunocephalichthys	-
	Bunocephalus	banjo cats
	Chamaigenes	-
	Dysichthys	-
	Erustichthys	-
	Hoplomyzon	-
	Petacara	-
	Platistus	-
	Platystacus	-
	Xiliphius	-
Astroblepidae	Arges	-
	Astroblepus	-
	Cyclopium	-
Atherinidae	Alepidomus	spotted silversides
	Bedotia	Madagascar rainbowfishes
	Melanotaenia	Australian rainbowfishes
	Nematocentris	Australian rainbowfishes
	Telmatherina	Celebes rainbowfishes
	Pseudomugil	-

Family	Genus and Species (if given)	Common Name
Auchenipteridae	Centromochlus	frontfin cats
	Trachycorystes	airbreathing frontfins
Bagridae	Chrysichthys	popeye bagrids
	Gephyroglanis	toothless bagrids
	Leiocassis	piebald cats
	Mystus	Indian cats
	Parauchenoglanis	variegated cats
Belontiidae	Belontia	combtail paradise fishes
	Betta	fighting fishes
	Colisa	banded gouramis
	Ctenops	croaking gouramis
	Macropodus	paradise fishes
	Malpuletta	-
	Sphaerichthys	chocolate gouramis
	Trichogaster	gouramis
	Trichopsis	dwarf gouramis
Callichthyidae	Brochis	highback armoured cats
	Callichthys	shrimpcats
	Corydoras	armoured cats
	Dianema	-
	Hoplosternum	longwhisker armoured cats
Centropomidae	Chanda (includes Ambassis)	glass perches
	Gymnochanda	threadfin glass perches
Chacidae	Chaca	chacas
Characidae	Alestes	halfstripe characins
	Alestopetersius	Congo characins
	Aphyocharax	bloodfin tetras
	Arnoldichthys	bigscale characins
	Astyanax (including Anoptichthys)	Mexican tetras
	Axelrodia	-
	Bathyaethiops	-
	Boehlkia	-
	Bryconalestes	-
	Bryconamericus	-
	Chalceus	pinktail characins
	Charax	humpback headstanders
	Cheirodon	cardinal tetras
	Corynopoma	swordtail characins
	Creagutus	goldstriped characins
	Creatochanes	orangefin characins
	Crenuchus	sailfin characins
	Ctenobrycon	silver tetras
	Epicyrtus	glass tetras
	Ephiphicharax	bigscale dollarfishes
	Gephyrocharax	platinum tetras
	Gymnocorymbus	black tetras
	Hasemannia	smoothback tetras
	Hemibrycon	blackwedge characins
	Hemigrammus	rainbow tetras
	Hollandichthys	-
	Holobrycon	mourning tetras
	Hyphessobrycon	painted tetras
	Iguanodectes	dace characins
	Knodus	-
	Ladigesia	-
	Leptagoniates	longfringe characins
	Markiana	stumptail tetras
	Megalamphodus	phantom tetras
	Metynnis	silver dollarfishes

Family	Genus and Species (if given)	Common Name
Characidae	Micralestes	sharptooth tetras
	Microbrycon	moonlight tetras
	Mimagoniates	croaking tetras
	Moenkhausia	glassy tetras
	Myleus	-
	Mylossoma	silver platesfishes
	Nematobrycon	rainbow tetras
	Paracheirodon	-
	Petersius	silver congos
	Phenogagaster	bigeye characins
	Phenacogrammus	Congo tetras
	Phoxinopsis	barb tetras
	Piabucus	band characins
	Poecilocharax	-
	Prionobrama	glass bloodfins
	Pristella	goldfinch tetras
	Pseudochalceus	-
	Pseudocorynopoma	dragonfins
	Stethoprion	highfin dollar fishes
	Tetragonopterus	ditto characins
	Thayeria	penguin fishes
	Triportheus	slender hatchets
	Tyttocharax	-
Chilodontidae	Chilodus	spotted headstanders
Cichlidae	Acguidens	acaras
	Acarichthys	-
	Acaronia	bigeye cichlids
	Apistogramma	dwarf cichlids
	Astronotus	oscars
	Aulonocerna	-
	Batrachops	-
	Biotodoma	-
	Biotocus	glassy dwarf cichlids
	Chaetobranchopsis	-
	Chaetobranchus	-
	Chilotilapia	-
	Cichlasoma	cichlids
	Corematodus	-
	Crenicara	chessboard cichlids
	Crenicichla	pike cichlids
	Cyathochromis	-
	Cyathopharynx	-
	Cynotilapia	-
	Cyphotilapia	-
	Eretmodus	-
	Etroplus	chromides
	Genyochromis	scale-eater cichlids
	Geophagus	eartheaters
	Haplochromis	mouth breeders
	Hemihaplochromis	-
	Hemichromis	jewel fishes
	Hemitilapia	leafcleaner cichlids
	Herotilapia	-
	Hoplotilapia	-
	Julidochromis	striped cichlids
	Labeotropheus	-
	Labidochromis	bucktooth cichlids
	Lamprologus	hog cichlids
	Leptotilapia	-
	Lethrinops	sand diggers
	Limnochromis	-

Family	Genus and Species (if given)	Common Name
Cichlidae	Limnotilapia	-
	Lobochilotes	-
	Macropleurodus	-
	Melanochromis	-
	Nannacara	dwarf acaras
	Nanochromis	-
	Neetroplus	-
	Pelmatochromis	spotfin cichlids
	Perissodus	-
	Petenia	-
	Petrochromis	-
	Petrotilapia	rockscrapers
	Plecodus	-
	Pseudotropheus	damsel cichlids
	Pterophyllum	freshwater angels
	Retroculus	-
	Serranochromis	seabass cichlids
	Simochromis	-
	Steatocranus	bumpheads
	Symphysodon	discus
	Teleogramma	slender dwarf cichlids
	Telmatochromis	-
	Tropheus	lake cichlids
	Urau	uraus
	Xenotilapia	-
Citharinidae	Nannaethiops	scaly tail citharinids
	Neolebias	smooth tail citharinids
Cobitidae	Acanthophthalmus	coolie loaches
	Acanthopsis	longnose loaches
	Botia	short loaches
	Cobitis	weather fishes
	Lepidocephalus	Indian loaches
Curimatidae	Acuticurimata	-
	Curimata	roach characins
	Curimatopsis	-
Cyprinidae	Aphyocypris	false whiteclouds
	Balantiocheilus	Bala sharks
	Barbus anemus	highfin silver barb
	B. arulius	longfin barb
	B. binotatus	spotted barb
	B. callipterus	clipper barb
	B. camptacanthus	African redfin barb
	B. chola	swamp barb
	B. conchonius	rosy barb
	B. cumingi	goldeye barb
	B. dorsimaculatus	blackline barb
	B. duneker i	bigspot barb
	B. everetti	clown barb
	B. fasciatus	striped barb
	B. fasciolatus	African banded barb
	B. filamentosus	blackspot barb
	B. gambiensis	brassy barb
	B. gelius	dwarf barb
	B. halei	hale barb
	B. hexazona	sixbanded barb
	B. holotaenia	spotscale barb
	B. hulstaerti	butterfly barb
	B. kersteni	kersten barb
	B. lateristriga	spanner barb
	B. lineatus	Malayan striped barb

Family	Genus and Species (if given)	Common Name
Cyprinidae	Barbus lineomaculatus	sevenspot barb
	B. melanampyx	ember barb
	B. nigrofasciatus	black ruby barb
	B. oligolepsis	checker barb
	B. paludinopsis	long redfin
	B. partipentazona	banded barb
	B. pentazona	five banded barb
	B. phutunio	pygmy barb
	B. puckelli	two spot barb
	B. roloffi	streakscale barb
	B. sachsi	golden barb
	B. schwanenfeldi	tinfoil barb
	B. semifasciolatus	halfstriped barb
	B. somphongsi	blacktip barb
	B. stigma	bandtail barb
	B. stigmatopygus	midspot barb
	B. stoliczkanus	platinum barb
	B. terio	onespot barb
	B. tetrarupagus	bandfin barb
	B. tetrazona	tiger barb
	B. ticto	tic-tac-toe barb
	B. titteya	cherry barb
	B. trispilos	threespot barb
	B. unitaeniatus	redfinned barb
	B. usumbarae	dace barb
	B. vittatus	banded barb
	B. viviparus	silver barb
	B. wohlerti	violet striped barb
	Barilius	slender barbs
	Carassius auratus (ornamental varieties)	goldfish
	Beirabarbus	Beira barbs
	Brachydanio	danios
	Crossocheilus	algae-eater barbs
	Cyclocheilichthys	round-scale barbs
	Cyprinus carpio (koi varieties)	koi
	Danio	giant danios
	Eirmotus	false barbs
	Epalzeorhynchus	flying fox barbs
	Esomus	flying barbs
	Garra	stonelappers
	Hemigrammocypris	-
	Horandiya	midget minnows
	Labauca	danios
	Labeo bicolor	sucker barb
	L. erythrurus	sucker barb
	L. munensis	sucker barb
	L. variegatus	sucker barb
	Luciosoma	-
	Morulius	-
	Oxygaster	glass barbs
	Puntipplites	yellow cheek barbs
	Rasbora	rasboras
	Rasborichthys	keelbelly barbs
	Tanichthys	whiteclouds
Cyprinodontidae	Aphanius	Asian pupfishes
	Aphyosemion	lyretails
	Aplocheilichthys	lampeyes
	Aplocheilus	panchax
	Austrofundulus	-
	Cualao	-

Family	Genus and Species (if given)	Common Name
Cyprinodontidae	Cubanichthys	Cuban killies
	Cynolebias	pearlfishes
	Epiplatys	epiplaties
	Garmanella	-
	Lamprichthys	-
	Micropanchax	roundtail panchax
	Notobranchius	annual fishes
	Pachypanchax	stout panchax
	Procatopus	-
	Pterolebias	South American lyretails
	Rachovia	dwarf poolfishes
	Simpsonichthys	-
	Trigonectes	false panchax
	Valencia	Spanish toothcarp
Distichodontidae	Distichodus	lobetail characins
Doradidae	Acanthodoras	chocolate cats
	Agamyxis	-
	Amblydoras	-
	Anadoras	-
	Apuredoras	-
	Astrodoras	-
	Autanodoras	-
	Centrochir	-
	Centrodoras	-
	Doras	thornycats
	Franciscodoras	-
	Hoplodoras	-
	Hypodoras	-
	Leptodoras	-
	Megalodoras	-
	Nemadoras	-
	Opsodoras	-
	Platydoras	-
	Orinocodoras	-
	Oxydoras	-
	Pseudodoras	-
	Scorpiodoras	-
	Trachydoras	-
Electridae	Carassiops	Australian sleepers
	Electris	river gobies
	Dormitator	sleepers
	Mogurnda	purple-striped sleepers
	Ophiocara	snakehead gobies
	Hypseleotris	chameleon gobies
Exocoetidae	Dermogenys	livebearing halfbeaks
	Hemirhamphodon	hookbill halfbeaks
Gasteropelecidae	Carnegiella	dwarf hatchets
	Gasteropelecus	hatchetfishes
	Thoracocharax	straightback hatchets
Gobiidae	Bathygobius	frillfin gobies
	Brachygobius	bumble bee fish
	Evorthodus	banner gobies
	Gobiopterus	glass gobies
	Gobius	gobies
	Scartelaos	-
	Stigmatogobius	fringefin gobies

Family	Genus and Species (if given)	Common Name
Goodeidae	Girardinichthys	-
	Goodes	placental livebearers
	Hubbsina	-
	Lermichthys	flat notchfins
	Neotoca	guppy notchfins
	Ollentodon	notchfins
Gyrinocheilidae	Gyrinocheilus	Chinese algae-eaters
Helogeneidae	Helogenes	thumb-cats
Helostomatidae	Helostoma	kissing gouramis
Hemiodontidae	Characidium	goby characins
	Hemiodopsis	-
Homalopteridae	Gastromyzon	torrentfishes
	Homaloptera	suckerloaches
Indostomidae	Indostomus	pygmy lake sticklebacks
Kneriidae	Kneria	African bluntnose
Kuhliidae	Nannoperca	pygmy perches
Lebiasinidae	Copeina	jumping characins
	Copella	slender sprayers
	Nannostomus	pencil fishes
	Poecilobrycon	tailstander pencils
	Piabucina	-
	Pyrrhulina	sprayers
	Rachoviscus	bluespotted characins
Loricariidae	Ancistrus	bearded suckercats
	Cochliodon	-
	Farlowella	twig cats
	Hassar	-
	Hemiancistrus	red plecostomus
	Lasiancistrus	-
	Loricaria	slender armoured cats
	Otocinclus	algae-eater cats
	Oxyloricaria	-
	Panaque	bandedfin suckercats
	Plecostomus (includes Hypostomus)	plecostomus catfishes
	Pterygoplichthys	-
	Spatuloricaria	-
	Stoniella	sailfin suckercats
	Xenocara	mopface cats
Luciocephalidae	Luciocephalus	pikeheads
Mastocembelidae	Bdellorhynchus	-
	Caecomastocembelus	-
	Macrognathus	filenose spiny eels
	Mastocembelus	spiny eels
	Pararhynchobdella	-
Mochokidae	Synodontis	upside-down cats
Monodactylidae	Monodactylus	monodactylus
Mormyridae	Campylomormyrus	-
	Genyomormyrus	-
	Gnathonemus	-
	Heteromormyrus	-
	Hippopotamyrus	-
	Hyperopisus	-
	Isichthys	-
	Marcusentus	-

Family	Genus and Species (if given)	Common Name
Mormyridae	Mormyrodes	-
	Mormyrops	-
	Mormyrus	-
	Oxymormyrus	-
	Paramyomormyrus	-
	Petrocephalus	-
	Phagrus	-
	Solenomormyrus	-
	Stomatorhinus	-
Nandidae	Acharnes	-
	Afronandus	African nandus
	Badis	dwarf chameleonfishes
	Monocirrhus	South American leaf-fishes
	Polycentropsis	African leaf-fishes
	Polycentrus	clearfin leaf-fishes
	Pomanotus	-
	Pristolepis	banded nandids
Notopteridae	Notopterus	African knifefishes
	Xenomystus	smoothback African knifefishes
Oryziatidae	Oryzias	ricefishes
Osphronemidae	Osphronemus	giant gouramis
Pangasiidae	Pangasius	-
Pantodontidae	Pantodon	freshwater butterfly fishes
Periophthalmidae	Periophthalmus	mudskippers
Parodontidae	Apareidon	waltzing parodons
	Parodon	parodons
Phractolaemidae	Phractolaemus	topmouth
Pimelodidae	Acentronichthys	forktail ridgebacks
	Heptapterus	ridgebacks
	Microglanis	dwarf marbled cats
	Pimelodella	longwhiskers
	Pseudopimelodus	false pimelodus
Poeciliidae	Alfaro	knife livebearers
	Brachyraphis	bishops
	Chesterodon	church key livebearers
	Girardinus	metalside livebearers
	Glaridichthys	swiftstream livebearers
	Jenynsia	one-sided livebearers
	Phallichthys	merry widows
	Phalloceros	dusky livebearers
	Poecilia (including Lebistes, Limia, Mollienesia, Micropoecilia)	guppies and mollies
	Poecilopsis	banded livebearers
	Poecilistes	porthole livebearers
	Priapella	smoky livebearers
	Pseudoxiphophorus	false swordtails
	Quintana	blackband livebearers
	Tomeurus	-
	Xenodexia	-
	Xiphophorus	swordtails and platies
Polypteridae	Polypterus	bichirs
	Calamoichthys	reed fishes
Prochilodontidae	Prochilodus	zebra-tail tetras
Scatophagidae	Scatophagus	scats
	Selenotoca	false scats

Family	Genus and Species (if given)	Common Name
Schilbeidae	Eutropiellus	-
	Schilbe	longback cats
	Parailia	speckled X-ray cats
	Physailia	African glasscats
Siluridae	Kryptopterus	glass cats
Soleidae	Achirus	Brazilian hogchokers
Syngnathidae	Doryichthys	freshwater pipefishes
	Microphis	freshwater pipefishes
	Nerophis	freshwater pipefishes
	Syngnathus	pipefishes
Tetraodontidae	Carinotetraodon	freshwater puffers
	Colomesus	freshwater puffers
	Sphoeroides	freshwater puffers
	Tetraodon	freshwater puffers
Toxotidae	Toxotes	archerfishes
Trichomycteridae	Pygidium	loach cats

Source of data: Federal Register 40 (37), Monday 24 February 1975, pp. 7935-43

APPENDIX VII

Extract from the State of California Fish and Game Code (California, 1971) referring to the shipment or receipt of infected, diseased or parasitized fish

Division 6, Part 1, Chapter 4:

6300. This chapter applies to all fish and amphibia including but not limited to fish and amphibia being imported or transported.

6301. The department is authorized to enter at any time any car, warehouse, depot, ship, or growing area where any fish, amphibia, or aquatic plants are held or stored, for the purpose of making an examination to ascertain whether such fish, amphibia, or aquatic plants are infected, diseased or parasitized.

6302. All fish, amphibia, or aquatic plants found to be infected, diseased or parasitized are a public nuisance and shall be summarily destroyed by the department.

6303. All fish, amphibia, or aquatic plants which the department determines are merely deleterious to fish, amphibia, aquatic plants, or aquatic animal life, shall be destroyed by the department, unless the owner or person in charge of the fish, amphibia, or aquatic plants, ships them out of the State within a period of time to be specified by the department.

6304. If the department finds any infected, diseased or parasitized fish, amphibia, or aquatic plants within the State, the department shall post notices describing, as nearly as possible, the boundaries of the area within which the fish, amphibia, or aquatic plants are found, and shall state the period during which the taking, carrying, and transportation of the fish, amphibia, or aquatic plants from the area shall be unlawful. The fact of posting the notices shall be published once a week for four successive weeks in some newspaper of general circulation in the county in which the infected area is situated, and, if there is no such newspaper in that county, then in a newspaper of general circulation published in an adjoining county.

6305. It is unlawful to carry or cause to be carried from one point in this State which has been posted according to the provisions of this article, to any other point in this State, any infected, diseased or parasitized fish, amphibia, or aquatic plant.

6306. The expense of any examination made necessary by the provisions of this code, shall be borne by the owner of the fish, amphibia, or aquatic plants, or any person or persons importing them into this State; provided, that the department may assume such expense in the case of fish imported to provide fishing under the authority of a sport fishing licence in the public waters of this State.

APPENDIX VIII

Proposed draft Fish Health Certificate for freshwater ornamental fish species

Certificate No.: .....

Country of Origin of Shipment: .....

Country of Destination of Shipment: .....

Name and Full Postal Address of Shipper: .....
.....
.....

Registered Licence Number of Shipper: .....

Carrier: ..... Flight Number: .....

The undersigned CERTIFIES that the fish which comprise the present shipment, and to which this FISH HEALTH CERTIFICATE refers, have been duly inspected by a Biologist, and on a basis of this fish disease inspection and examination, have been found to be free from the following diseases:

1. ichthyophthiriasis (Ichthyophthirius multifiliis)
2. oodiniasis (Oodinium spp.)
3. dermatomycosis (Saprolegnia spp., Achyla spp.)
4. diplostomiasis (larvae of Diplostomum sp.)
5. ectoparasitic copepods (Argulus spp., Ergasilus spp., Lernaea spp.)
6. ectoparasitic monogenes (Dactylogyrus spp., Gyrodactylus spp.)

Furthermore, in the opinion of the Fish Diseases Inspector, the fish which comprise the present shipment show no clinical evidence of bacterial haemorrhagic septicaemia, myxobacteriosis, digenetic trematode metacercariae, or nematodes.

Signature of Fish Diseases Inspector: .....

Official Stamp of Certifying Authority: .....

Place and Date of Issue: .....

APPENDIX IX

Proposed draft Fish Health Certificate for saltwater ornamental fish species

Certificate No.: .....

Country of Origin of Shipment: .....

Country of Destination of Shipment: .....

Name and Full Postal Address of Shipper: .....
.....
.....

Registered Licence Number of Shipper: .....

Carrier: ..... Flight Number: .....

The undersigned CERTIFIES that the fish which comprise the present shipment, and to which this FISH HEALTH CERTIFICATE refers, have been duly inspected by a Biologist, and on a basis of this fish disease inspection and examination, have been found to be free from the following diseases:

1. cryptocaryoniasis (*Cryptocaryon irritans*)
2. oodiniasis (*Oodinium* /*Amyloodinium*/ *ocellatum*)
3. ectoparasitic trematodes
4. ectoparasitic copepods

Furthermore, in the opinion of the Fish Diseases Inspector, the fish which comprise the present shipment show no clinical evidence of lymphocystis and/or obvious tumour-like growths, bacterial haemorrhagic septicaemia, or digenetic trematode metacercariae.

Signature of Fish Diseases Inspector: .....

Official Stamp of Certifying Authority: .....

Place and Date of Issue: .....